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Fuel Economy of a Drop Forge Plant

Prime Importance of Correct Valve Setting and Absence of Leaks — Test Results Show Large Savings Effected by Careful Attention to Details

BY N. A. CRAIGUE AND C. H. L. THOMPSON*

UNLESS a special effort is made in the nature of certain repairs, the steam consumption of drop forging hammers is large—so large in some cases as to offer an excellent opportunity, by decreasing this steam use and keeping wastes at a minimum, to lower production costs at a very small expenditure of effort. This excessive use of steam is due to the severe service the hammers receive in producing drop forgings. The continuous shock and vibration result in rapid wear of all operating parts of the hammers, keeping the repair crew on the jump to maintain them in operating condition. In most cases only sufficient repairs are made to permit the forging hammer to turn out the work satisfactorily, with no direct attention paid to decreasing steam consumption, by making other repairs and adjustments.

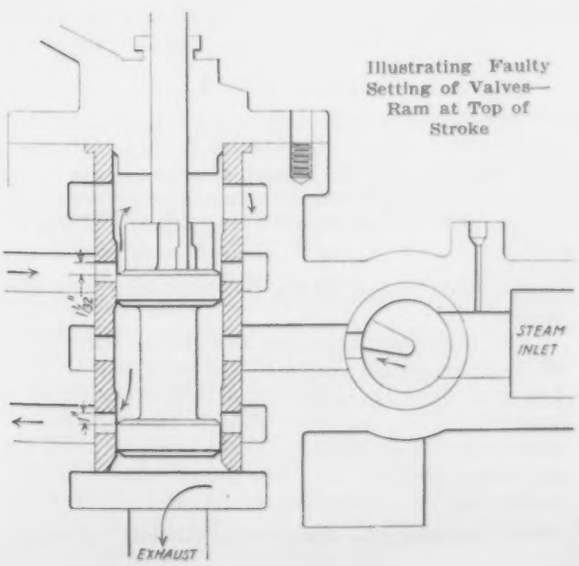
Manufacturers of drop-forging hammers are very chary in advancing information on the steam consumption of hammers, for the very good reason that they realize this to be a function of the use and condition of the equipment. They state that the steam consumption will range between 2 and 3 boiler hp. per 100 lb. of falling weight. It can be readily seen that the difference between 2 and 3 b.hp. per 100 lb. falling weight would have an appreciable effect on the installation of a new forge plant of (say) 100,000 pounds, for if 3 is used, one-half more boiler equipment, or 1000 b.hp. would be added. At an installation cost of $120 per b.hp., $120,000 would be expended for the extra boilers.

As a matter of fact, the steam consumption of new hammers will be much less than 2 b.hp., or for sake of simplicity 64 lb. of steam per hr., per 100 lb. of falling weight. This also holds true if old hammers are properly repaired. On the other hand, if the hammers are not given the necessary attention to keep the steam consumption at a minimum, this may be as great as 90 lb. of steam, or nearly 3 b.hp., per 100 lb. of falling weight. To show the importance of this difference one plant, having 138,000 lb. of nominal falling weight of steam hammers, made a fuel saving of $5,000 per month by reducing steam consumption from 90 lb. to 62 lb. per 100 lb. of nominal falling weight.

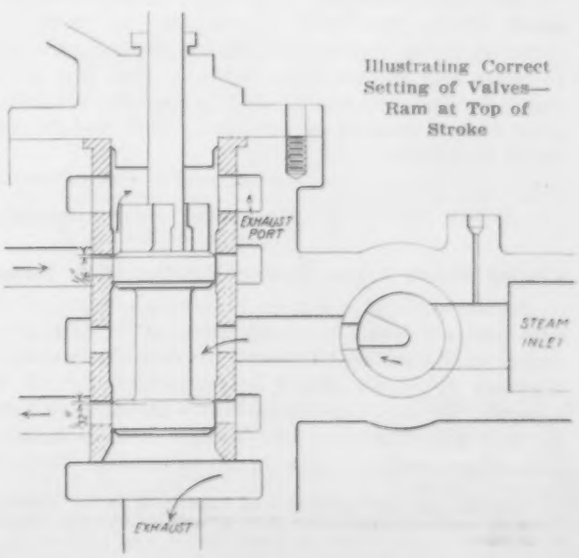
In the majority of forging plant designs, some method of utilizing the exhaust steam is provided. It may be used to heat buildings in winter, or low pressure steam turbines may be installed; but rarely does the equipment use all of the exhaust available, for in the summer, for approximately five months, heating is not necessary, and due to varying load factor the turbines do not use all the exhaust available. Then when it is necessary to exhaust the steam to atmosphere, a third of the steam consumed may be used wastefully.

The superintendent of a forge plant will argue rightly that his job is to produce forgings to agree

*The du Pont Engineering Co., Wilmington, Del.

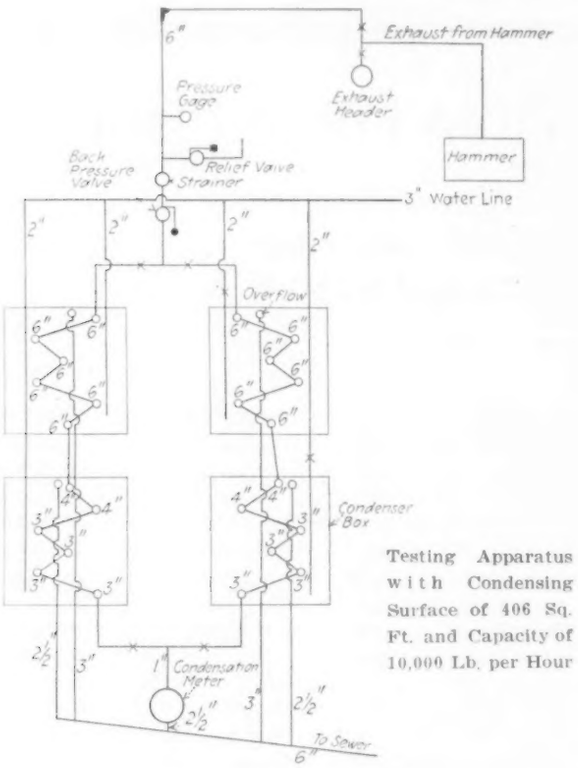


Illustrating Faulty Setting of Valves—Ram at Top of Stroke



Illustrating Correct Setting of Valves—Ram at Top of Stroke

with the production schedule. His labor costs may be low (a bonus system of wages may be in effect) and the forgings of first class quality; yet the steam loss in the shop may amount to $200 per day or more, dependent upon the size of the plant and the number of hammers installed. With present economic conditions, the reaching of maximum production from the installed equipment may not be so important as producing the



Testing Apparatus with Condensing Surface of 406 Sq. Ft. and Capacity of 10,000 Lb. per Hour

forgings at as low a cost as possible. Economy of production is probably now the first requisite.

In the campaign for reducing operating costs, one of the most profitable sources of attack is the steam waste of the hammers. To accomplish this object considerable continuous test work is necessary. Means and methods of doing this work, as given herewith can be used. Descriptions of testing equipment and methods are of value, and can be applied with modifications to any steam drop forging plant.

Computing Steam Costs for Fuel Only

Generally the only saving effected, when steam consumption is decreased, is in the use of fuel. Of course, decreasing the steam load on the boilers may so lower the overload rating that the repair costs are lessened, but this is questionable. Also, reducing the steam load rarely affects the number of firemen. So, to be conservative in the statement of saving involved, it is safe to figure only the reduction in fuel. Then the cost of steam for fuel only can be used for showing the dollars gain when economies are effected. This may be computed as follows:

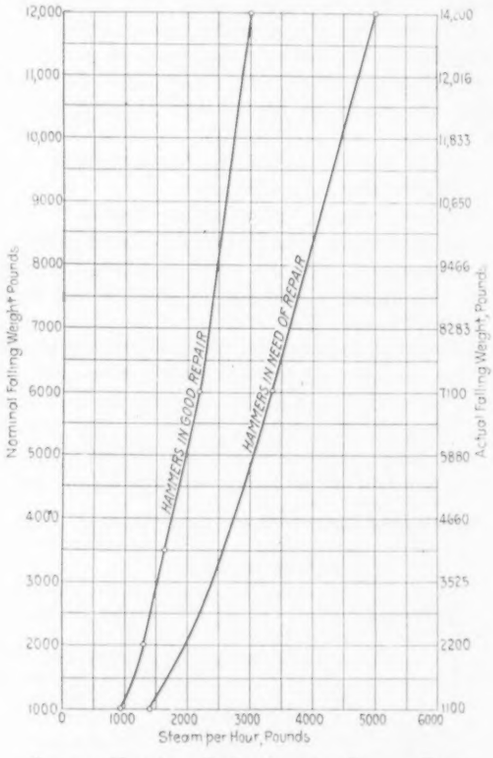
$$\text{Fuel cost of steam in dollars per lb.} = \frac{\text{Cost of coal in dollars* per lb.}}{\text{Actual lb. water evaporated per lb. of fuel fired}}$$

Closing Steam Valves During Non-Operating Periods

At the start of a test on a forge plant one of the first points to check is the tightness of the throttle or rocker valves on the hammers. During idle periods of the shop the steam should be completely shut off the hammer. In most cases these valves do not close tightly; they allow steam to leak through into the hammer, and either condense or exhaust to waste. Then, to eliminate this loss, it is necessary to utilize the main steam valves, either of the globe or gate type, closing these valves during the non-operating periods. If there is any doubt of these valves seating tightly, the bonnets should be taken off and if necessary new seats installed. This waste of steam during non-operating periods is quite important and is the easiest to correct. At one shop this simple expedient resulted in a fuel saving of $50 per day, during the 8-hr. shut-down period (including Saturday afternoon and Sunday), or $2,000 per month reduction in fuel as burned.

To emphasize this further, a rather unique situation developed in the boiler room supplying the forge plant where this saving was effected. The test crew arranged to shut off the individual valves on the steam feeder lines to the hammer during idle periods. Unfortunately the boiler room was not warned of the coming reduction in steam load. When these valves were shut off every pop valve on the boilers opened, releasing steam to the atmosphere. The firemen were kept busy checking fires and the boiler room foreman hastily sent out several men to discover what main header valve had been inadvertently shut off.

This situation was out of the ordinary run of events and the firemen at the time did not know the reason for the sudden decrease in load, because theretofore during idle periods the main valves on the hammers were allowed to remain open, except in case of repairs. This resulted in the steam leaking through the hammers, part of it exhausting and part condensing in the cylinders. When the closing of these valves became a regular part of the forge shop routine, two of the three



Curves Showing Reduction in Steam Consumption After Needed Repairs Had Been Made to Various Classes of Steam Drop Hammers

boilers were banked during the eight-hour shut down period.

The foregoing represents the saving that can be effected during idle periods. The next step is the reducing of steam consumption during operation of the hammers. This, the most difficult part of the work, necessitates considerable testing in order to prove when and where repairs are warranted. The causes of wastes can be summarized as follows:

1—Barrel shape of the steam cylinder.

*Include cost of handling coal outside of boiler room, as handling costs are generally proportional to quantity of coal as used.

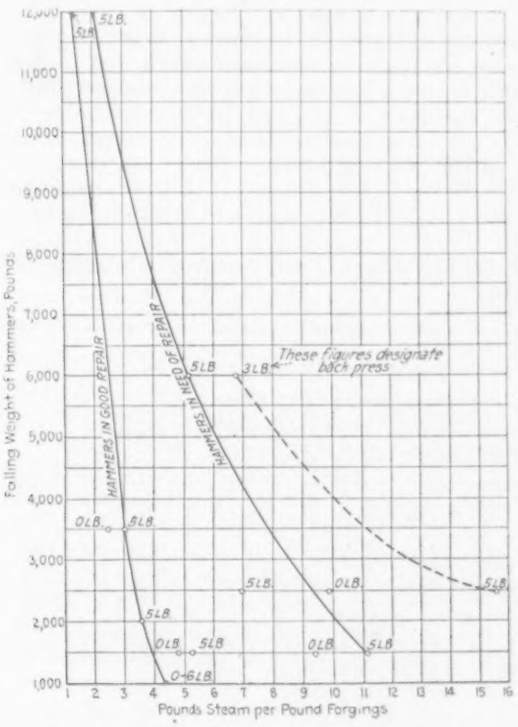
This results in the steam leaking past the piston while hammer is in motion. Generally, the cylinder must be re-bored and a sleeve inserted.

2—Bad setting of control valves.

The valves can be so set that the hammer will operate properly, yet be very wasteful of steam. This is discussed in detail further on.

3—Leaky stuffing boxes.

This waste is obvious and should be kept at a minimum.



Curves Showing the Steam Consumption in Pounds per Pound of Forgings Made, Indicating Importance of Keeping Hammers in Good Repair

4—Cracked castings, cylinder walls, piping, etc.

This waste is also obvious.

5—Control valves worn and leaking steam. If this is very bad, the hammer will not function properly.

6—Valve seats on the main inlet and main exhaust valves worn and leaking steam.

It is important that these latter valves be shut off tight during non-operating periods, and even during working periods when it is necessary to cool the dies. It is better to block the dies apart rather than keep steam on, to hold the hammer up by the steam pressure on the upward stroke, with part of the steam exhausting to waste, due to the valve lead.

Testing Equipment

Due to the pulsating effect of steam as used by hammers, it is impossible, with the present state of flow-meter development, to measure the high-pressure steam in the supply line on individual hammers. In consequence it is necessary to condense the exhaust steam and weigh the condensate or water. For this purpose, some form of condenser is required with ample cold water available for cooling purposes. The condensate can either be weighed by means of platform scales and barrels or some form of condensation meter can be used, of which several good makes are available.

For obtaining the test results as given, the following described equipment was used. One diagram shows the general plan of apparatus.

Condensers.

Box No. 1—125 sq. ft. of condensing surface. 6 lengths 12 ft. long, 6-in. pipe.

Box No. 2—Same as No. 1.

Box No. 3—78 sq. ft. of condensing surface. 2 lengths 12 ft. long, 4-in. pipe; 4 lengths 12 ft. long, 3-in. pipe.

Box No. 4—Same as No. 3.

All condenser boxes made of tongue and groove 2-in. plank, each box 14 ft. long, 3 ft. wide and 3 ft. deep, braced across ends, bottom, sides, and top with ½-in. round stay rods.

Total sq. ft. of condensing surface, 406 sq. ft.

Capacity of condensers, 10,000 lb. of steam per hour, or 25 lb. per sq. ft. of pipe surface per hour.*

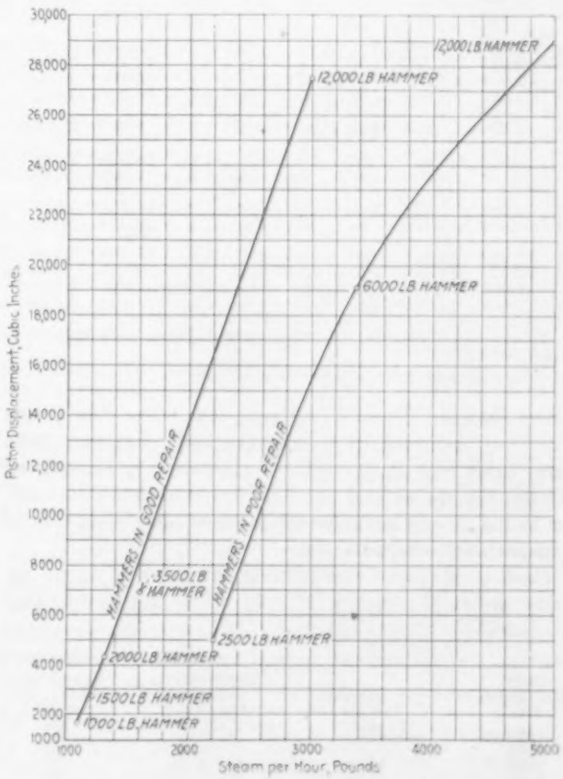
The equipment as given is the result of considerable experimental work for measuring the consumption of large 12 000-lb. hammers. During the early stages of the test on the large hammers only 250 sq. ft. of condensing surface was used. As this was found inadequate, for the steam consumption was excessive, due to poor condition of the hammer, additional boxes were added.

Four condenser boxes gave advantageous flexibility. The cooling water could be used economically, for the discharge water from one box could be used as supply water for the others when hammers of the lower ratings were tested. In addition, for making tests at 0 lb. back pressure, it was desirable to connect the condensers in parallel, in order to decrease the friction losses in the condenser piping.

Pressure Gages. Calibrated test gages were installed on the main steam supply and exhaust line of each hammer under test.

Relief Valve. In order not to interfere with the operation of the hammers being tested, an atmospheric relief valve was installed on the exhaust line, and set to open at about 8 lb. pressure.

Back Pressure Valve. To obtain the steam consumption of the hammers under actual conditions of about 5 lb. back pressure, an adjustable automatic back



Steam Consumption of Hammers Related to Cubic Inches of Piston Displacement, Showing Importance of Keeping the Hammers in Good Condition

*If a better type of condenser were available, or one having copper tubes, this rate could be increased to at least 50 lb. of steam per sq. ft. per hour, the area of condenser tubes could be cut down to 200 sq. ft., and still give a capacity of 10,000 lb. of steam per hour.

pressure valve was installed in the exhaust line.

Strainer. It was necessary to install a large strainer in the exhaust line, to prevent pieces of packing from clogging up the condenser or condensation meter. This was placed between the relief valve and back pressure valve.

Exhaust Header. As each hammer was tested separately, it was necessary to pipe the exhaust from each hammer to the condenser equipment. In all cases this exhaust line was the same size as the hammer exhaust line (or larger).

Weighing Condensate. As condensation meters are thoroughly reliable, one of large capacity was used for weighing the condensate, thus relieving the test men of the necessity of using barrels and scales. In consequence, more attention could be paid to the hammer under test.

Flowmeters on Entire Shop. Two steam flowmeters were installed on the two main feeder steam lines to the entire hammer shop. Checking the individual hammer condensation tests, based on idle and working hours, and the total steam as shown by the flowmeters, showed the total measurements as recorded by the table is valuable for designing condensing equipment and determining the amount of water required for testing various sizes of hammers.

Definition of Terms Used in Forging Practice

The terms or phrases used in this article are the ones most familiar to drop forge men, but in order to avoid any possible misinterpretation, all terms are defined.

Nominal Falling Weight. The ordinary classification of a hammer, i. e., a 2000-lb. hammer.

Actual Falling Weight. The actual weight of the piston, piston rods, ram and falling die.

Working Hours. The number of hours that the hammer was actually operating during test period.

Idle Hours. The time that the hammer stood idle during the test.

Lb. Steam in Working Hours. The steam consumption during working hours.

Lb. Steam in Idle Hours. The steam consumption necessary to hold piston at top of stroke when hammer is idle.

Total Lb. Steam. Total consumed during the period of test.

RECAPITULATION OF TEST DATA

Test No.	Falling Weight Nominal	Falling Weight Actual	Steam, Lb. per Sq. In. Pressure	Steam, Lb. per Sq. In. Back Pressure	Hammer Hours Working	Hammer Hours Idle	Steam Consumption Working Hrs.	Steam Consumption Idle Hrs.	Steam Consumption Total	Average Steam Consumption Per Working Hr.	Average Steam Consumption Per Idle Hr.	Average Steam Consumption Per Hr.	Lbs. Steam per Hr. per Lb. Falling Weight Nominal	Lbs. Steam per Hr. per Lb. Falling Weight Actual	Total Forgings Pounds	Total Forgings Number	Remarks
1	1,000	1,100	91	6	10	9	12,200	8,200	20,400	1,220	911	1,074	1.07	0.985	2,735	730	Poor
2	1,000	1,100	92	6	8	2	8,100	1,200	9,300	1,012	600	930	0.93	0.845	2,150	574	Good
3	1,000	1,100	91	0	6¼	2½	8,700	2,800	11,500	1,390	1,120	1,315	1.32	1.196	2,622	700	Poor
4	1,500	1,750	96	5	7½	2	9,300	1,800	11,100	1,240	900	1,170	0.78	0.67	995	362	Poor
5	1,500	1,750	99	5	6	1	5,400	600	6,000	900	600	857	0.57	0.395	1,130	411	Good
6	1,500	2,200	101	0	7⅓	1½	7,500	400	7,900	1,024	268	896	0.598	0.407	1,638	596	Fair
7	1,500	1,750	98	0	5⅔	3⅓	6,300	4,000	10,300	1,110	1,045	1,085	0.72	0.62	1,097	399	Poor
8	2,000	2,200	101	0	5	1¾	6,700	2,300	9,000	1,340	1,315	1,330	0.665	0.605	1,520	451	Poor
9	2,000	2,200	100	5	4¼	0	5,400	....	5,400	1,270	000	1,270	0.635	0.578	1,725	512	Good
10	2,000	2,200	97	5	8½	1½	9,500	1,000	10,500	1,170	667	1,050	0.525	0.478	2,829	839	Good
11	2,000	2,200	102	5	8⅙	⅚	9,700	500	10,200	1,187	417	1,134	0.567	0.520	2,032	603	Poor
12	2,500	3,000	102	0	8½	1	19,400	2,000	21,400	2,280	2,000	2,250	0.855	0.75	1,959	290	Poor
13	2,500	3,000	103	5	6⅔	2⅓	14,100	3,700	17,800	2,120	1,590	1,978	0.79	0.66	2,025	300	Good
14	2,500	3,000	105	0	9	½	20,100	1,000	21,100	2,233	2,000	2,221	0.887	0.74	2,129	315	Poor
15	2,500	3,000	100	5	7¾	1¾	16,100	2,600	18,700	2,080	1,485	1,970	0.789	0.658	1,200	800	Good
16	3,500	4,050	102	5	6⅔	1⅙	8,800	2,400	11,200	1,320	1,310	1,320	0.38	0.326	3,759	125	No force to blow
17	3,500	4,050	99	0	6¼	1½	10,000	1,400	11,400	1,600	934	1,470	0.42	0.363	4,500	150	Good
18	3,500	4,050	102	5	5¾	2¾	8,800	2,400	11,200	1,530	875	1,320	0.38	0.326	3,759	125	Good
19	6,000	7,100	101	3	6½	2	21,800	4,900	26,700	3,360	2,450	3,140	0.525	0.443	4,000	121	Fair
20	6,000	7,100	98	5	7⅙	1⅙	24,000	2,400	26,400	3,350	2,060	3,150	0.53	0.457	5,180	157	Good
21	12,000	14,200	98	5	6⅛	3⅛	31,300	8,400	39,700	5,080	2,655	4,260	0.355	0.300	15,600	240	Poor
22	12,000	14,200	100	5	6⅛	⅛	30,100	300	30,400	4,880	1,800	4,810	0.403	0.341	19,175	295	Good
23	12,000	14,200	98	0–5	2⁵⁄₁₂	2¹⁄₁₂	5,700	1,800	7,500	2,360	863	1,665	0.138	0.117	5,850	90	Good
24	12,000	14,200	101	0–5	5⁵⁄₁₂	3⅓	12,900	3,600	16,500	2,385	1,080	1,886	0.157	0.133	11,700	180	Fair

NOTE.—In Test No. 16, the control valve was almost closed, so that enough steam could not be admitted to give force to the blows.

meters between 2 and 5 per cent low. The flowmeters were thus assumed to be substantially correct. Both steam lines had eight right angle turns in the piping between the meter and the first hammer; this, in addition to the diversity factor of hammer operation, tended to smooth out the pulsations.

Cooling Water. For testing hammers of large capacity an ample supply of cold water for condensing purposes is important. With hammers in poor condition the steam is discharged for a few seconds in large amounts, thus calling for a condenser of large capacity and water of adequate amount. The accompanying

Condenser Surface Necessary for Various Sizes of Hammers

Size Hammer Lb.	Lb. Steam Per Hr.	Condenser Surface Required	Cooling Water, Gal. per Min.
1000	2000	80 sq. ft.	45
1500	2000	80 sq. ft.	45
2000	2100	84 sq. ft.	47
2500	2200	88 sq. ft.	50
3500	2600	104 sq. ft.	60
6000	3400	136 sq. ft.	77
12000	10000	400 sq. ft.	250

NOTE.—The above assumes that hammers are in poor condition, wrought iron condenser piping is to be used, and 65 deg. Fahr. cooling water is available.

$$\text{Lb. Steam per Average Working Hour} = \frac{\text{Total Steam, Working Hours}}{\text{Total Working Hours}}$$

$$\text{Lb. Steam per Average Idle Hour} = \frac{\text{Total Steam, Idle Hours}}{\text{Total Idle Hours}}$$

$$\text{Lb. Steam per Average Hour} = \frac{\text{Total Steam}}{\text{Total Hours}}$$

$$\text{Lb. Steam per Hour per Lb. Nominal Falling Weight} = \frac{\text{Total Steam}}{\text{Total Hours} \times \text{Nominal Falling Weight}}$$

$$\text{Lb. Steam per Hour per Lb. Actual Falling Weight} = \frac{\text{Total Steam}}{\text{Total Hours} \times \text{Actual Falling Weight}}$$

Testing of Hammers

During the early stages, it is best to select a hammer of lower rating, for then the testing equipment can be given a thorough try-out and the necessary provisions made for the testing of the larger hammers. The first test is of course to measure the steam consumption of the hammer under operating conditions. Test results should be obtained during idle and work-

ing hours, attention being given to steam pressures and number of blows per forging. Data should also be obtained on the actual weight of falling parts of the hammer, production in pounds of forgings during test and average weight per forging.

After the first test is completed, the hammer should be inspected and, if necessary, valve adjustments made, stuffing box repacked and any leaks corrected. When the hammer is thought to be in first-class shape, another steam consumption test may be made and the differences between the two tests can be noted. While the repair crew is being educated as to what repairs are necessary, some experimental work can be done, particularly as regards valve setting, until a point is reached where the hammer has a minimum steam consumption, consistent with proper operation.

During the progress of the individual tests, total steam consumption readings, by means of steam flowmeters, can be taken on the steam as fed to the entire forge plant. This steam consumption, as compared to forge productions of individual hammers revised for working and idle hours operation, will show immediately the results of any reductions in the steam consumption for the entire forge plant.

Setting of Valves

Proper setting of the actuating valves is the most important feature in reducing the steam consumption, for the economy of the hammer suffers very materially when the valves are improperly set. Referring to the diagrams of valve settings, it has been the writers' experience that the best efficiency will be obtained by setting the actuating valve, when the ram is at top of stroke, so that the steam inlet is 1/32 in. and the exhaust clearance 1/16 in. This is illustrated, as is also a faulty valve setting that has been frequently found, where the hammer man was complaining that his hammer lacked force in its blows. After his valves were properly set, no further trouble was experienced in producing forgings quickly.

With greater clearance in the inlet and exhaust sides than given above, the steam consumption of the hammers, when standing idle, is often greater than when the hammer is working and producing forgings. As an illustration, the steam consumption of a 12,000-lb. hammer that was tested was found to be at the rate of 5000 lb. per hr., during idle periods; while another hammer of the same size, working on the same class of forgings, consumed 3000 lb. per hr. while working and 600 lb. per hr. when idle. The first hammer wasted steam at the rate of 4400 lb. per idle hour, or at a fuel cost of $2.60 per hr.

*Standards for Various Types of Hammers in Good Operating Condition**

Nominal Falling Weight, Lb.	Working Period, Lb. of Steam per Hr.	Idle Period, Lb. of Steam per Hr.
1000	1100	500
1500	1200	500
2000	1300	500
2500	1400	1000
3500	1600	1000
6000	2200	1000
12000	3000	600

*As determined by actual tests.

Continuous Testing of Hammers

By having steam flowmeters on the main supply lines to the forging plant, daily readings can be obtained which show the plant economy. To take into consideration variations in production, it is necessary to establish, by the individual tests, the steam consumption for all classes of hammers, per working hour and per idle hour. Then the record of the idle and working hours, multiplied by the steam consumption standards for each, and the grand total compared with flowmeter readings, will show the condition of the hammers. If the flowmeter readings are in excess, the hammer economy is poor and the steam consumption is in excess of the standards.

In the above standards, the ram was at top stroke during the idle hours with the exception of the 2500, the 3500 and the 6000-lb. hammers, which were oscillating. The standard cut-off for all hammers tested was 40 per cent.

Back Pressure on Hammers

Most forge plants operate with back pressure in the steam exhaust lines. Experienced hammer men claim that there is a cushioning effect, due to this back pressure, which helps produce better forgings. Neglecting the increase in steam consumption, this is a distinct advantage, so that the exhaust can be used for heating or other purposes. About 5 lb. back pressure is the standard.

Auxiliary Exhaust Lines

As the exhaust from the cylinders of the hammers usually ties into a main exhaust header, there is no means of inspecting individual exhausts if auxiliary exhausts are not provided. If these additional exhaust lines are piped in, so that the steam can be, for a short time, exhausted direct to the atmosphere, a means of inspecting the condition of the hammer is available. Inspection can be made during working and idle times, and after observing the exhaust of a hammer in good condition, experience will show need of valve setting or repairs to valves, cylinder or piston. These auxiliary exhaust lines will decrease the amount of testing by condensation measurements, and will be a guide for the repair crews.

Recapitulation of Test Data

To make a fair comparison of the tests, one should take into consideration the type, the number and the weight of the forgings made, versus the total steam consumption and the total working hours. For example, take tests No. 1 and No. 2 on a 1000-lb. hammer making the same class of forgings. Test No. 1 shows a steam consumption of 1074 lb. per hour with 38.4 forgings per hour; while test No. 2, on the same hammer after overhauling, shows 930 lb. of steam and 57.4 forgings per hour.

Tests numbers 4 and 5, 8 and 9, 12 and 13, 16 and 17, 19 and 20, 21 and 22, can be paired and compared in the same way, as they were run under similar conditions. This is shown graphically on one diagram, where the steam consumption per pound of forgings for the different types of hammers is given.

A movement to expedite public work to afford employment to large numbers of idle workmen has been started at Youngstown, Ohio. It is estimated fully 20,000 men are idle due to stagnation in the iron and steel industry, and consequent reduced operations. In spite of the large volume of unemployment, there has not been a proportionate increase in the demand on charitable organizations, as families of steel workers are living on earnings accumulated during the war. Many of these men, temporarily out of employment, are glad to get work on highways at 30c. per hour.

The American Steel Rolling Co., 1203 North Charles Street, Baltimore, has preliminary plans under way for the erection of a new plant at Monument and Eighth Street, for the manufacture of iron and steel rods, reinforcing bars and kindred products. It is proposed to establish an initial output of about 15,000 tons per annum. W. Y. Schall is superintendent in charge; Reuben S. Baldwin is general manager.

Foundry laborers in Belleville, Ill., who have been on a strike for several weeks, have voted to accept the proposition of employers, providing for a wage of 47c per hr. to be effective until Dec. 31, 1921. The previous wage was 55c per hr.

Engine Building in the United States

Steam, gas and other engines built in 371 plants in the United States in 1919 accounted for a product of $464,770,000, according to a bulleting of the Census Bureau. This represents an increase of 544.4 per cent over the $72,121,000 reported for 1914. Some of the outstanding features of the bulletin follow:

As 1919 prices differed materially from those prevalent in 1914, the bare statement of dollars of output does not provide a true picture of the advance of the industry. Department of Labor figures show that, with 1913 as a basis at 100, prices in the group of "Metals and Metal Products" averaged 87 in 1914 and 161 in 1919. Translating 1919 figures into 1914 prices on this basis (which, perhaps, will not apply exactly for engines, but may be regarded as a fair approximation) the 1919 output of the industry appears to have been about $251,000,000 in 1914 dollars—an advance of 248.5 per cent over 1914, instead of 544.4 per cent. Similarly equated figures are shown for details of the output in the table.

Value of Products	1914	Figures as Reported — 1919	Figures as Reported — Per Cent Increase	On Basis of 1914 Prices — 1919	On Basis of 1914 Prices — Per Cent Increase
Steam engines*	$5,402,000	$7,617,000	41.0	$4,116,000	24 *d*
Steam turbines*	3,689,000	9,837,000	166.7	5,316,000	44
Marine engines§	338,000	23,332,000	6803.0	12,610,000	3631
Marine turbines§	**	28,217,000	....	15,250,000	...
Total steam engines†	9,429,000	72,047,000	664.2	38,939,000	313
Gas and gasoline engines*	20,648,000	48,941,000	137.0	26,449,000	28
Automobile and aviation engines‡	10,122,000	71,733,000	608.7	38,768,000	283
Marine gasoline engines§	6,426,000	19,153,000	198.1	10,350,000	61
Total internal combustion†	37,696,000	141,709,000	275.9	76,585,000	103
Traction engines¶	4,209,000	124,546,000	2859.0	67,305,000	1499

*Stationary and portable. **Not separately reported in 1914. †Includes minor items not listed. ‡Not including engines made in plants whose chief product was automobiles or aircraft. §Not including engines made in plants whose chief product was ships or boats. ¶Not including locomotives. *d* Decrease.

Railroad Wages Reduced

The United States Railroad Labor Board announced an average wage reduction of 12 per cent at Chicago on June 1. The wage cut, which becomes effective on July 1, will reduce the pay of railroad employees about $400,000,000 per year. The decision affects 104 roads whose requests for reductions had been filed since April 18, when the hearings before the board commenced.

Eventually the reduction will apply to all lines and those which have not yet filed their applications will present their cases during the current month. The decision establishes new uniform scales for all groups of employees from track laborers to enginemen and conductors and instructs each road to apply the new scales to the special classes for which it had asked reductions. Some lines thus far have asked for cuts in the wages of common labor only, while others have included other classes of employees, and a few have asked for reductions for all employees. It is therefore apparent that before the full effect of the reductions is felt, further applications must be filed with the board by the various carriers. When all of the new schedules have been applied to all of the lines, the total railroad payroll will be reduced $400,000,000 a year. Thus the cut does not wipe out the advance of $600,000,000 authorized by the board on May 1, 1920.

Higher Salaries Necessary

WASHINGTON, June 7.—Material increases in the salaries of technical and scientific employees of the Government are necessary in order to prevent wholesale resignations in the various scientific bureaus. This opinion has been expressed to the joint Congressional committee, considering reclassification of federal employees and bureaus, by A. T. Koehler, secretary of the Federal Council of the American Association of Engineers.

In substance, a similar view was stated by a number of scientific and technical employees of the Government. The latter are supporting the Sterling-Lehlbach in preference to the Smoot-Wood measure. Support of the Sterling-Lehlbach measure by Government employees is based on the claim that it provides a real classification, while the Smoot-Wood measure, they say, calls for only a mere change of pay and is in no sense a reclassification and would simply mean a continuation of the same injustices and inequalities now existing. The Federal Council of the American Association of Engineers presented a schedule of salaries it deems necessary to keep up the morale and efficiency of the various bureaus, stating that unless some such action is taken the Government will lose, within a few months many of its valuable technical employees. Many recommendations are made by the council which, if adopted, it claims, will meet the approval of the profession at large as well as the technical and scientific employees of the Government. The council does not give full approval of either of the pending measures. It states that its recommendations for increased salaries will provide more equitable compensation, permitting allocation of an employee at the minimum, maximum or intermediate salary of a given grade, according to merit. It also suggests that it believes it essential that any bill which is brought into operation shall contain provisions for an executive agency under the control of the President, to harmonize all questions regarding allocation and which shall function as a board of appeal for the employees.

Immigration Under New Law

WASHINGTON, June 7.—Immigrants to the number of approximately 360,000 will be admitted to the United States during the fiscal year, beginning July 1, under the Dillingham percentage immigration law. The number by countries was announced last week by Commissioner of Immigration W. W. Husband. Under the new law the allotment of immigration is based upon 3 per cent of the number of immigrants from given countries in the United States in 1910. The largest number to be permitted will be 77,206 from the United Kingdom, with Germany ranking second, with 68,039. Some of the other important countries and the number of immigrants permissible are: Norway, 12,116; Sweden, 19,956; Denmark, 5644; Poland with Western Galicia, 25,800; Switzerland, 3745; Italy, 42,021; Russia, 34,247; Austria, 7444; Hungary, 5635; Rumania, 7414; Greece, 2286; Czecho-Slovakia, 14,269 and Jugoslavia, 6405.

Not Promoting Socialism

WASHINGTON, June 7.—That the International Labor office is not "a laboratory for the manufacture of a particular brand of 'social' or 'socialist' doctrines," and that it has not "entered into direct relations with trade unions and other workers' organizations instead of keeping its activities within the limits which would be imposed upon them were they to confine their relations to Government departments only," is the unanimous opinion of the commission of experts appointed by the Council of the League of Nations in accordance with a resolution adopted by the Assembly of the League at its meeting of Dec. 17, 1920. A summary of the findings of the commission was made public yesterday by Ernest Greenwood, American correspondent of the International Labor office.

Design and Proportions of Hot Blast Stoves*

Consideration of Laws Governing Circulation of Gases While Heating and Cooling—Historical Designs Reviewed

BY W. E. GROUME-GRJIMAILO†

IN 1860 Cowper applied the regenerative principles of Siemens to the heating of the air for blowing blast furnaces. But at first these hot blast stoves were not a success. In his Manual of Metallurgy, Percy-Wedding shows some of the early designs of hot blast stoves, one of which appears in Fig. 1. The first

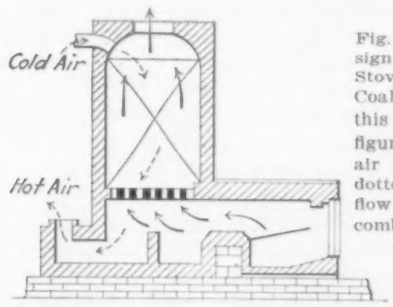


Fig. 1. Early Design of Hot Blast Stove Fired with Coal or Coke. In this and subsequent figures the flow of air is shown by a dotted arrow; the flow of products of combustion, by a solid arrow

stoves were heated with coal fires; the gas from the blast furnace was not utilized until later.‡. The hot products of combustion from the fire flowed directly upward and to the top of the stove and passed out of the structure through a primitive chimney valve in the dome. The cold blast entered the apparatus at the top and the hot blast valve was connected to the lower part of the stove. It may be readily seen that the currents

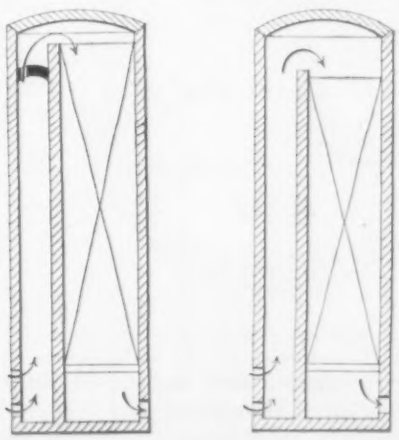


Fig. 2. Two Forms of Cowper's Later Designs of Two-Pass Side Combustion Chamber Stove, Showing Correct Method of Air Circulation. In one the arch is pierced by an orifice so proportioned that combustion will be completed within the side combustion chamber

of gas and air in this apparatus were circulated in the wrong directions—that is, in the opposite direction to the natural convection currents.

Cowper perceived the erroneous method of gas circulation in his early design, and in later designs the currents of gas and air were circulated in the correct direction (Fig. 2). Combustion took place in a central or eccentrically placed chamber, the hot gases rising to the dome, where they were reversed and subdivided among a number of parallel passes down through the checkerwork, and uniting in a lower chamber they were carried away through the chimney valve. The cold blast enters the stove chamber below the checkerwork, through which it passes upward in a number of parallel streams to the dome of the stove, where it changes direction and passes downward through the combustion chamber to the hot blast valve. The Cowper hot blast stove retains this general arrangement to the present day.

It would be difficult to find any apparatus which has passed through as many modifications of design as have these stoves; but few of the changes have come into extended use, because practically all of them have been based upon an entirely false idea in regard to the laws governing the circulation of gases while heating

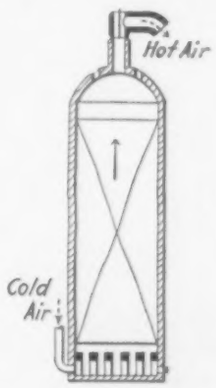


Fig. 3. Moore's Patented Single-Pass Construction

and cooling. The single weak point of the Cowper hot blast stove lies in the location of the combustion chamber, which in the form of a vertical tube or chamber occupies a large amount of space and is poorly adapted for the purpose for which it is employed. The attempts to improve the design of these stoves should be directed toward the elimination of this tube from the combustion chamber. The space located immediately below the dome of the stove might be employed for a combustion chamber, as is suggested further on in this article. Moore's patent (Fig. 3) shows such a single pass construction, but it is badly worked out. In Moore's stove the hot gases of combustion pass upward, in the opposite direction to their natural convection currents.

Withwell made the first modification of the Cowper stove. The experiment shown in Fig. 4 illustrates the defect of the Withwell stove. Two designs of stove were photographed, immersed in a glass tank filled with water, Withwell's design on the left and the Cowper design on the right, during the period when they are upon gas, or heating. The uniform level of the lower surfaces of the colored kerosene forced downward through the checker passes of the Cowper stove illustrates the regularity of the heating of its checkerwork. On the other hand, in the Withwell stove, the chambers

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†Professor of iron manufacture at the Polytechnic Institute of Petrograd. The translation is by A. D. Williams.

‡Note by translator: The early blast furnaces were simple open-topped shafts without any bell or hopper, the gas burning at the head of the furnace. The blast pressure was very low. The charging was elementary; in many cases the top of the furnace was reached by an inclined plane up which the charge was carted in simple dump-carts, which were backed up to the open shaft and dumped the charge into it. Later, when the bell and hopper were utilized to close the top of the furnace, the gas became available for heating the blast and making steam. The name, hot blast stove, is a survival from the early coal fired stove.

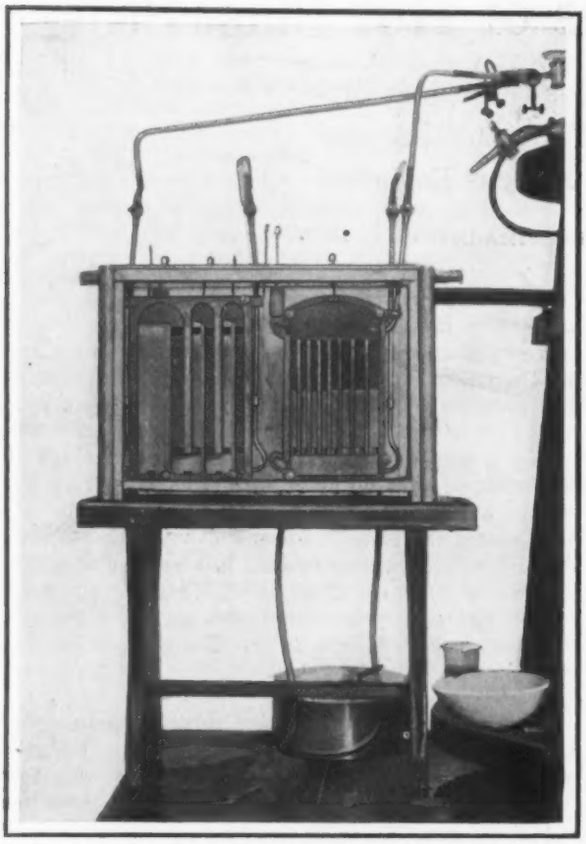


Fig. 4. Experiment Showing the Defect in the Withwell Stove, at the Left, Compared with the Cowper Stove, at the Right. The latter is heated uniformly, the former is not

are filled with the colored kerosene in a manner which is far from uniform. The chambers through which the kerosene descends are completely filled, while those in which it rises are not filled at all; the kerosene rising in a thread-like stream which comes into contact with a very small portion of the wall area of the chamber.

These chambers, therefore, will not be uniformly heated, and for this reason will impart very little heat to the air. If water is introduced at the lower part of the model, representing the cold blast which is being heated, it will be seen that those chambers through which the water rises fill perfectly, while in those in which the water passes downward, it falls in small

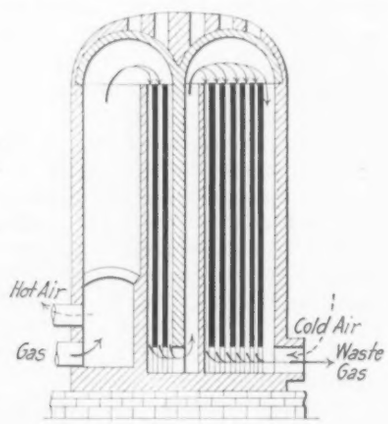


Fig. 5. Later Design of the Withwell Hot Blast Stove

streams which have very little contact with the walls of the chamber. A mere glance at these models is sufficient to show clearly the reasons which have led to the complete abandonment of the Withwell stove.

Withwell noted the defects in his own stove and in a later design (Fig. 5) he gave the hot gases a circulation in the proper direction, from top to bottom. This design of his stove approximates the type of regenerator shown in Fig. 23 in the article "Design of Open-Hearth Furnaces," page 1510, THE IRON AGE, May 27, 1920. The ideas of Withwell have found their realization in the Massick and Crook stove, which had quite a name at one time, and which was distinguished from the Withwell stove only by the arrangement of the passes, so that the gases traveled alternately up and down through the three passes. In practice the Massick and Crook stove has been superseded for reasons which will be clearly evident.

Juggling Heating Surface and Pass Areas

When methods of arranging the checkerwork heating surface and passes are considered, many inventors have applied themselves to the problem of securing uniformity in its working apparently without the slightest suspicion that the regular and uniform descent of the hot gases in cooling is a natural property of the gases. For a time the design of stove patented by Becker (Fig. 6) was much favored; the openings in the checkerwork were given different dimensions. It is evident that this will result in a less uniform heating than will be secured in the ordinary design of the Cowper stove. This Becker design has less frictional resistance in the large openings than there will be in the small, accordingly the waste gases from the large passes will be hotter than the gases from the smaller passes.

In the model (Fig. 4) of the Cowper stove, the cross section was intentionally made with checker openings of several sizes, in order to show, in graphic manner, that such complications of the checkerwork are useless.

To insure a uniform distribution of the hot gases through the checkerwork, J. Z. Stephenson and J. Evans resorted to a series of complicated walls and dampers in the chamber below the checkers (Fig. 7). The discussion

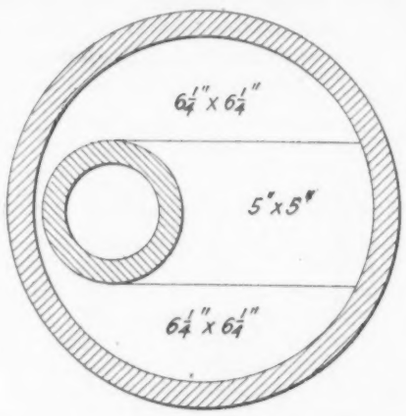


Fig. 6. Becker's Hot Blast Stove —Section Showing Arrangement of Checkers in Three Groups—Figures Indicate Sizes of Passes

between Luhrmann and these inventors in the technical journals is mentioned merely as a matter of interest. Luhrmann contended that the largest portion of the waste gases passed through the section above *A* and the smallest portion passed through the section above *C*. The inventors claimed the contrary. This discussion made it clearly apparent that the ideas of contemporary constructors, in regard to the circulation of the gases, were most remarkably confused, but the quarrel was finally settled to the satisfaction of both parties.

In the Cowper stove, the work of the checkerwork is inherently uniform, and all walls and dampers below the checkers, for the purpose of distributing the gases, are superfluous. In the *Revue de Métallurgie*, February, 1913, page 362, can be found the designs of a Cowper stove built for the blast furnace at Caen, France, and provided with five chimney valves connecting the chamber below the checkerwork with a bustle pipe outside the stove. The idea, of course, was that this would conduce to the uniform distribution of the gases heating the checker work. This idea in many ways, resembles that of Stephenson and Evans, but the multiplication of the chimney valves is useless. It would be sufficient to replace them by a single valve whose dimensions may be computed by the formula of Yesmann.

The number of designs of hot blast stoves in which the attempt is made to circulate the hot gases in cooling, and the cold gases in heating, in directions contrary to their natural convection currents is very large. The design sketches of Hartmann (Fig. 8), Hugh Kennedy (Fig. 9), Macco (Fig. 10), Frank Roberts (Fig. 11), Harvey (Fig. 12), show that the laws governing the sub-

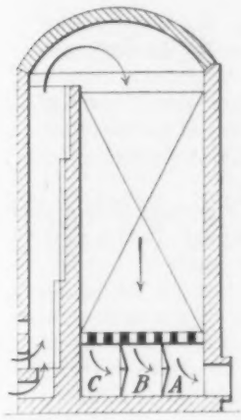


Fig. 7. Stephenson and Evans Hot Blast Stove, with Dampers to Regulate the Distribution of the Gases

division of currents of hot gases while cooling, and cold gases while heating, are not very well understood at the present time.

Construction of the Combustion Chamber

In the statements which follow, the attempt has been made to show the rational location of the combustion chamber for a hot blast stove. For this reason it is necessary to digress slightly at this point in order to set forth the rational chamber conditions necessary for combustion.

If a flame or jet of burning gases, in which the reaction of combustion has not been completed, is directed into a cold chamber or upon cold objects, combustion

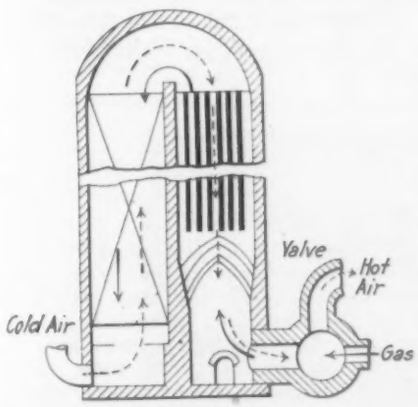


Fig. 8. Hartmann Design of Hot Blast Stove

will not be completed even in the presence of an enormous excess of air. Theoretical combustion, without an excess of air, can be obtained only when the reactions of combustion are completed in a chamber where the flame is surrounded by incandescent walls and within which it is held during one or two seconds. The construction of the combustion chamber must be such that it is possible to hold the flaming gases in the chamber a predetermined length of time, and in which the walls of the chamber will be heated to the highest possible temperature.

How should the flame of reacting gases be brought into the combustion chamber?

In the Cowper stove (Fig. 2), the combustion chamber forms a cylindrical or elliptical opening extending the full height of the stove, and open into the space below the dome at its upper end. Guilow, in an article in *Revue de la Société russe de Métallurgie*, 1911, page 164, gives the volume of the different portions of a Cowper hot blast stove at the Kouchwa works, and the time of the gas in these portions, as follows:

	Volume, Cubic Meters	Volume, Cubic Feet	Time, Seconds
Combustion chamber	14.53	513.1	4.60
Dome of stove	6.16	217.5	1.77
Checkerwork openings	42.40	1497.3	16.96
Chamber below the checkerwork	5.14	181.5	5.14
Totals	68.23	2409.4	28.47

Note by translator: It is interesting to compare these volumes with the volumes of hot blast stoves given in a paper by Arthur J. Boynton, National Tube Co., Lorain, Ohio, before the October, 1916, meeting of the American Iron and Steel Institute. The Russian furnace is undoubtedly much smaller than the American furnaces.

Though the volume of the Cowper combustion cham-

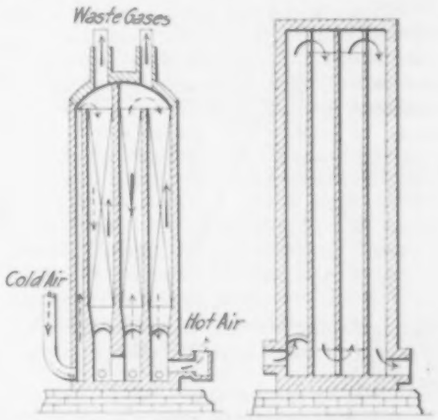


Fig. 9 (at Left). Hugh Kennedy Design of Hot Blast Stove

Fig. 10 (at Right). Macco Hot Blast Stove

ber is very large, it does not function satisfactorily, because the streams of flaming gases have a very high temperature and a correspondingly slight density. For these reasons they rise rapidly, and leave the combustion chamber without encountering any obstruction to delay them, flowing into the space below the dome. Hence the column of flaming gases, rising without filling

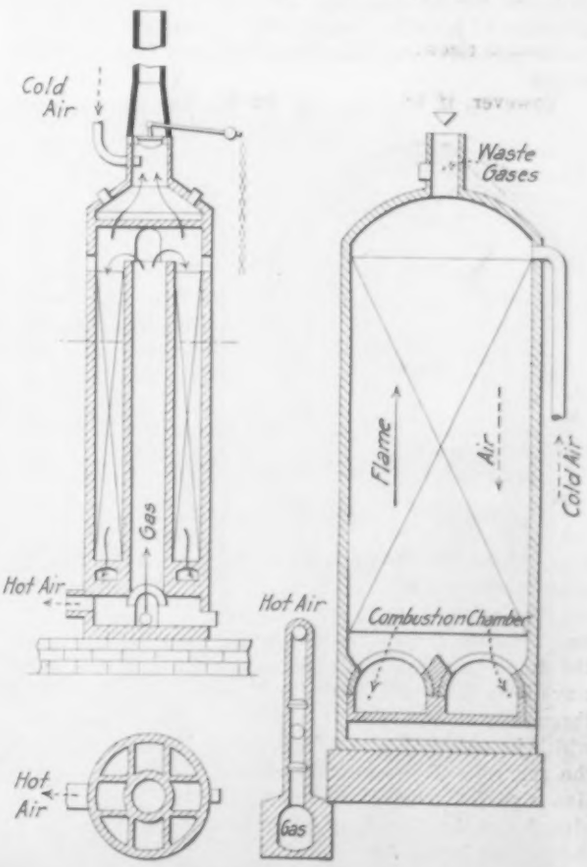


Fig. 11. Frank Roberts Design of Hot Blast Stove

Fig. 12. Harvey Hot Blast Stove

the combustion chamber, passes through a surrounding atmosphere of unburned and relatively colder gases.

Direct observation of the combustion of blast furnace gas in the Cowper hot blast stove shows that, as the ratio between the gas and the air supply approaches the theoretical requirements, combustion ceases to be silent and becomes noisy. The flame commences to jet out around the gas burner in bursts, indicating tem-

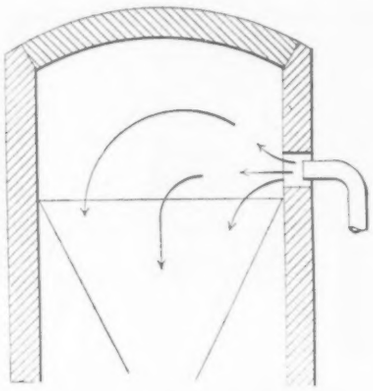


Fig. 13. Improper Arrangement of Burner for One-Pass Stove with Top Combustion Chamber

porary extinguishing of the flame in the combustion chamber, which immediately fills with a comparatively cold explosive mixture.

Location of Combustion Chamber

Everything indicates that the correct location for the combustion chamber of the Cowper stove is the dome or space above the checkerwork. The streams of flame which are produced cannot pass directly out of this chamber, but are held under the dome, heating its walls from below. The dome forms a permanent firebox for their combustion. Below the dome of the Cowper stove, therefore, there is a stationary hot zone, which burns the portions of the gases which were not utilized in the combustion chamber, as soon as they come into contact with the heated chamber. For these reasons the construction of a Cowper stove with the combustion chamber located elsewhere than in the dome is fundamentally wrong.

However, if the gas and the air are simply intro-

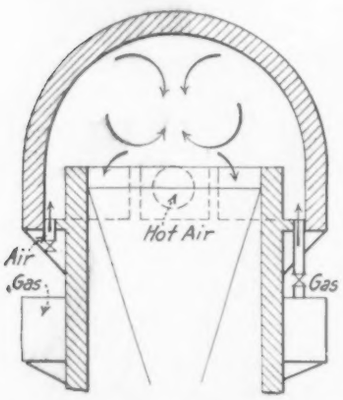


Fig. 14. Arrangement of Burners Suggested by Author for One-Pass Hot Blast Stove

duced above the checkerwork of the stove, as in Fig. 13, there is the danger that a portion of the cold gas and air, in place of entering into the reaction of combustion and forming a flame, will drop down to the bottom of the stove, through the checker openings, in the same way in which a heavy liquid will sink downward through a light liquid. To prevent this phenomenon, which is undesirable and wasteful, it is useful to direct the currents of gas and the cold air for their combustion upward toward the dome of the stove, and to give the combustion chamber an arrangement similar to that shown in Fig. 14.

There are many advantages in constructing a hot blast stove in this manner. In the Cowper type the combustion chamber actually occupies nearly 35 per cent of the space inside of the shell, and causes an unnecessary increase of nearly 50 per cent in the cost of the stove. The analysis of this particular case of combustion chamber construction permits the following rules to be deduced for their arrangement:

1. The jet of flame in the chamber should not be directed horizontally;

2. The streams or jets of gas and air entering the chamber should be, where possible, directed upward toward the dome or roof;

3. The products of combustion should be carried away from the combustion chamber at the hearth level, in either a vertical or a horizontal direction, as shown in Fig. 15.

Nevertheless, it is sometimes necessary that a vertical combustion chamber should be used. In this case it is not necessary to repeat the error made by Cowper and construct the chamber as an open pit (Fig. 2). It can be covered by an arch pierced by one or more openings, whose total area may be arrived at by the use of the formula for furnaces having an orifice in their roof for the escape of the waste gases, as given in an earlier chapter of this work.

If the area of these orifices and the volume of the combustion chamber are correctly proportioned, the combustion pits of the Cowper stove will be completely

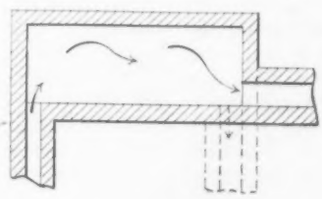


Fig. 15. Two Alternative Methods of Carrying Products of Combustion Away from the Combustion Chamber

filled with the burning gases, which will be held in the combustion chamber, by reason of the strangulated outlet, until the reaction of combustion is completed. The free space below the dome of the stove will cease to play the part of a combustion chamber, and it becomes possible to carry the checkerwork up higher into the dome of the stove.

(*To be continued*).

Order for Rails Confirmed

The British Empire Steel Corporation, Montreal, Que., has confirmed a recent announcement from Sydney, N. S., that a considerable order for steel rails had been placed with the Dominion Iron & Steel Co., Ltd. It was also stated that the Nova Scotia Steel & Coal Co. would manufacture the accessories for these rails, including tie-plates, rail joints, bolts and spikes, which will be made at the Trenton, N. S., works. The Dominion Steel Corporation has also a contract for a large quantity of steel bars for the new harbor works at Vancouver, B. C., which, with the general requirements of the country in the way of rails, wire, wire rods, etc., will ensure fairly active operations for some time and will enable the company to work much of the stock of raw materials laid in last season in anticipation of requirements for the execution of contracts which were cancelled or abandoned after having come to a practical conclusion.

D. F. Zollner and others have formed the Youngstown Stamping Co. at Youngstown, Ohio, which has purchased the plant and business of the Ungar Sheet Products Co., manufacturer of stovepipe. The new company plans to enlarge the production by adding a line of pressed metal specialties. The company's capital consists of $50,000 of preferred stock and 1,000 shares of non-par value common. Its plant is located on Manning avenue in Youngstown.

The Piron By-Product Coke Ovens

Italian Vertical Downward Combustion Type Recently Introduced in This Country —Results Obtained at Woodward, Ala.

A TYPE of by-product coke oven new to American practice has recently been in operation at an Alabama plant for demonstration purposes. The new ovens are the Piron, and 12 of them were constructed about a year ago at the Woodward Iron Co.'s plant, Woodward, Ala. They were built in conjunction with 18 Koppers ovens, having replaced 12 of the latter type in a battery of 30. The following description of the Piron ovens has been prepared from data furnished by the American Italian Commercial Corporation, 2 Rector Street, New York.

Description of the Ovens

The Piron ovens are of the general type of horizontal rectangular by-product coke ovens and constructed according to Mr. Piron's patent, U. S. 1,306,023. Their size has been adapted to the American standards, i.e., 16 to 18 in. in average width, 10 to 12 ft. in height, 39 to 42 ft. in length between the buckstays and 42 to 47 in. from center to center. They have been constructed of silica brick with a capacity for 12.5 tons of dry coal and can be built with a capacity up to 16 tons. Figs. 1 and 2 are cross sections of the side wall and the coke chamber. Fig. 3 is a general view of the ovens.

The most prominent characteristic is the continuous heating from the top downward, without inversion of any kind, and the continuous recuperation of heat instead of the usual regeneration.

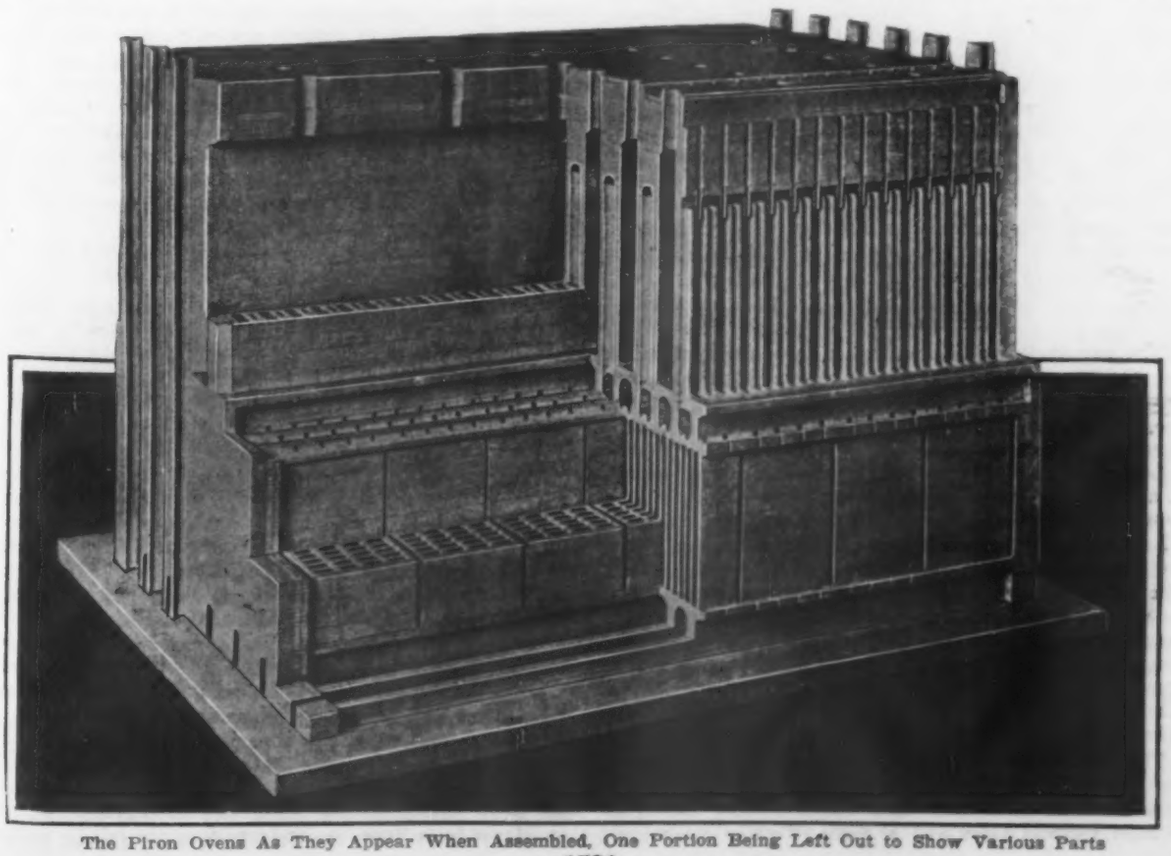
The recuperator of heat is composed of joining rows of vertical flues (1) for air and (5) for burned gas. These rows are arranged alternately in such a manner that the wall between two rows is in contact with the burned gas from one side and with the air from the other side and transmits the heat continuously from the burned gas to the air. There are two, four or six rows of flues to each oven.

Situated below the rows of vertical flues of the recuperator are horizontal channels (2) for fresh air and (8) for burned gas. The admission of fresh air is regulated by the registers (3) and the suction of the stack channel (9), by the registers (10), so that the regulation and the starting and stopping of operation of each oven is independent. Small orifices (4) and (7) located at the bottom of each vertical flue of the recuperator are intended to secure equal distribution of air and suction of burned gas without causing resistance in the higher part of the ovens.

The air drawn through the registers (3) in the horizontal channels (2) by the natural draught of the vertical flues (1), ascends in these flues growing hot, crosses the horizontal channel (11) and continues its way upward through the vertical air flues (12) provided in the bottle brick of the side walls; and then, upon reaching the upper part of these channels, it changes its direction and descends in the vertical heating flues of the side walls.

The gas is distributed in the heating flues by a distribution pipe (14) located above the oven, with branches (15) (one for each heating flue), through which inspection of the flue can be easily made. Coming into the upper part of the heating flue, the gas meets the hot air and burns while descending. The burned gas passes in the bottom channels through the orifices (13), then continues downward through the vertical flues (5) of the recuperator and passes through the orifices (7), the horizontal channel (8) and the register (10) to the stack channel (9).

The ovens are loaded through four charging holes and one coal larry if the standpipes are situated on the pusher end, or preferably, by two coal larries if the standpipes are situated in the middle of the ovens. The standpipes are 15 to 20 ft. high and are connected to the collecting main by movable elbows. Eventually two collecting mains are provided to separate the rich



The Piron Ovens As They Appear When Assembled, One Portion Being Left Out to Show Various Parts

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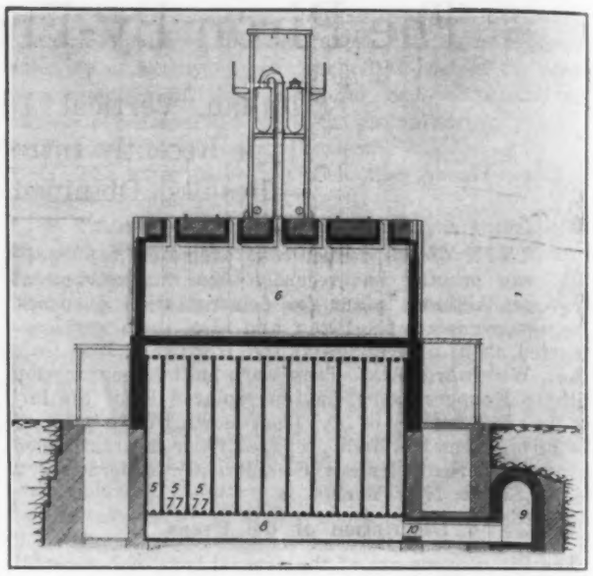

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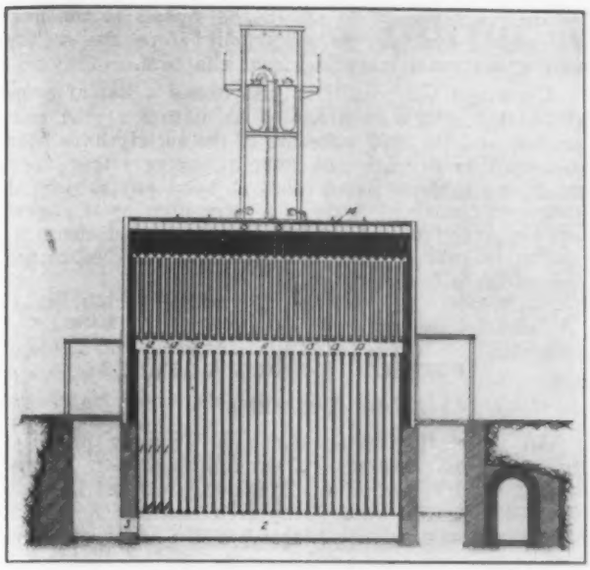

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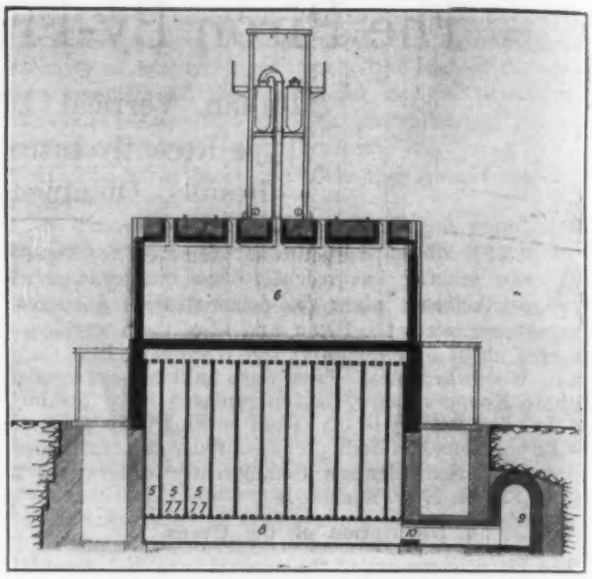

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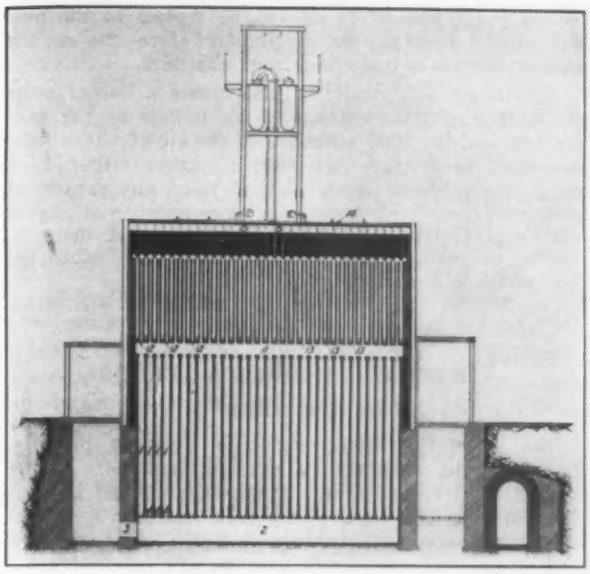

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FOUNDRY EXHIBITION IN 1922

A Return to the Old Practice of Holding Spring Meetings

The uncertainties which for some time have surrounded the 1921 exhibition of the American Foundrymen's Association have been cleared up in a statement just issued by C. E. Hoyt, secretary of the association, from its offices at 140 South Dearborn Street, Chicago. Both the time and place of the exhibition of this year have been under consideration and there has also been discussed the question of postponement. At a meeting of the executive committee of the association held in New York, May 28, it was decided to hold the next convention and exhibit in April or May at a place to be selected by the Committee on Convention and Exhibits. The statement of Secretary Hoyt is as follows:

"From the date of organization to 1911 the conventions of the American Foundrymen's Association were held in May or June of each year. In 1912 it was found necessary to postpone the convention scheduled for June at Buffalo until late in September, due to delay in completing the building in which the exhibits were to be placed, and since that time the annual meetings have been held in the fall.

"At the annual meeting of the board of directors of the association, in Rochester, N. Y., Dec. 7, 1920, invitations for the next convention were referred to the committee on convention and exhibits. When this committee met in Cleveland on March 30 to consider the place of the next meeting it was found that in none of the eight cities considered was it possible to find, during September or October, adequate hotel accommodations and exhibition facilities to properly care for such meetings as were held in 1919 and 1920.

"Confronted with this situation and taking into consideration general industrial conditions, the committee adopted a resolution recommending to the board of directors that the convention be held in New York in October or November of this year, without exhibits.

"This recommendation was referred by letter to the members of the board and expressions of opinion requested. On May 28 the executive committee of the board met and after due consideration of the recommendations of the committee and expressions of opinion by the members of the board, it was unanimously resolved that the next convention and exhibit of the American Foundrymen's Association be held in April or May, 1922, at a place to be selected by the convention and exhibits committee.

"With the hotels disposed to reserve a larger percentage of their rooms for a convention in the spring than in the fall, and with the probability that better exhibition facilities can be secured in the spring of 1922, it is hoped that no difficulty will be experienced in making satisfactory arrangements for the next convention and exhibit, the place and date of which will be announced later."

The Steel Treaters' Convention and Exhibition in September

Lt.-Col. A. E. White, national president of the American Society for Steel Treating, has made the announcement that Prof. H. L. Campbell, 1103 E. Huron Street, Ann Arbor, Mich., has been appointed chairman of the meetings and papers committee of the society, to secure papers for presentation at the Indianapolis convention and exhibition to be held Sept. 19 to 24. Associated with Professor Campbell on this committee are: George O. Desautels, president Imperial Drop Forge Co., Indianapolis, Ind.; and Victor Hillman, metallurgist Crompton & Knowles Loom Works, Worcester, Mass.

The board of directors has authorized the awarding of a gold medal for the best paper presented at the Indianapolis convention and a silver medal for the second best paper. While the awarding of these medals for this year has been made to apply to those papers presented for this year's convention, the policy in future years will be to award the medals to the first and second best papers presented before the society during the year, including local chapters.

Chairman Campbell has just issued a list of some of the subjects it is proposed to discuss at the convention, and the 3200 members of the society have been requested to prepare and submit papers either upon one of the subjects listed below or upon any subject of their own choosing. Already a large number of papers has been received, and many have indicated their intention to submit papers to the committee before the date of the convention.

"Inverted" Chilled Castings

BY C. A. HEISE*

An interesting phenomenon in foundry practice, for which no satisfactory explanations were forthcoming until recently, was frequently noticed in Germany during the war. Gray iron castings having a white core were often obtained in the ordinary sand casting process, thus exhibiting the typical feature of the chilled casting—but for the reversed order of layers, the chill being located inside the casting. Various reasons of a more or less satisfactory nature were advanced at the time in explanation of that phenomenon but on the whole no definite clues were ascertained pointing to the true causes of the trouble except the fact, that such "inverted" chilled castings, as they were termed, were almost invariably obtained whenever oxidized scrap was used at the foundry.

It was held by some authorities that the reversed order of layers was primarily due to a high content of phosphorus but this view proved incorrect, since the same feature was observed in castings, the analysis of which showed a normal phosphorus content. In all cases, however, the Baumann sulphur pressure test pointed to an exceptionally high sulphur content and a corresponding low carbon and manganese content and at last a clue was found. While sulphur usually occurs in form of manganese sulphide, the low manganese content of the castings caused the surplus sulphur to enter a chemical combination with the iron. Sulphide of iron, however, melts at 950 deg. C. and the separation of the gases when cooling down was found to prevent a separation of the graphite which in any case is already greatly reduced by the presence of sulphur. Owing to its relatively low melting point, the sulphide concentrates at the core of the casting, as the result of which white cast iron is produced.

With a view of counteracting the "inversion" effects, an increase of the manganese content is suggested since manganese sulphide has a higher melting point than iron, manganese or iron sulphide. An increase in the lime percentage as well as caution in the use of oxidized scrap is also recommended.

*Berlin, Germany.

Rev. Alva W. Taylor, professor in Columbia College, Columbia, Mo., who is touring the country under the auspices of the Interchurch World Workers, discussing the steel strike of 1919 before a large audience at Newport, Ky., on Sunday last, stated that the strike was not called for the purpose of securing an increase in wages, but to obtain collective bargaining agreements with the employers. In speaking of the request of President Wilson that the workers defer the strike, Mr. Taylor declared that the reason this was not done was that union leaders saw in the strike a chance to organize all steel workers.

The Chateaugay Ore & Iron Co. has engaged Freyn, Brassert & Co., engineers, Chicago, for the work of remodeling the blast furnace plant at Standish, N. Y., and for the construction of a Dwight & Lloyd sintering plant at mines at Lyon Mountain, N. Y. The sintering plant will supplement the ore concentrating plant and will produce a low phosphorus copper-free sinter for shipment to the blast furnace at Standish.

Sheet Rolling Mills at Baltimore

Built for Needs of Automobile and Furniture Trades—Top Rolls of Roughing Mills Driven by Independent Motor

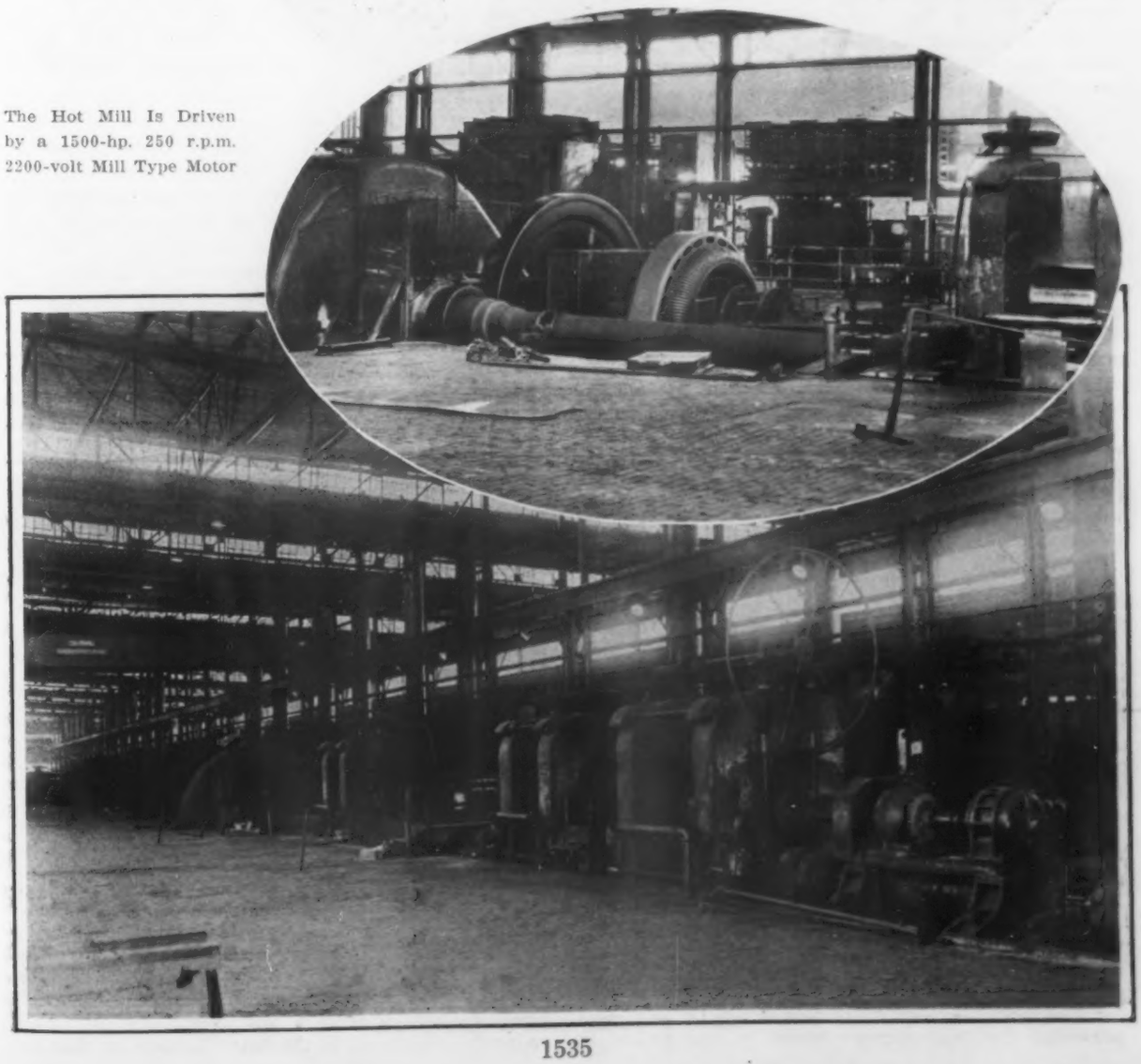
ONE of the most modern specialty sheet mill plants for the manufacture of high grade sheets for the automobile and furniture trades and for other finishes is that of the Eastern Rolling Mill Co., Baltimore, which was put in operation in May, 1920. All departments are operated entirely by electric drives and are laid out so that there may be no lost motion in the moving of stock from one to the other. Possessed of excellent railroad and tidewater facilities, the site has further advantages by reason of the availability of labor and also electric power transmission from the Susquehanna River. Not alone does the location insure good service for the domestic market but it is strategetically suitable for export trade as well.

The present equipment includes 12 finishing hot mills and eight stands of roughing mills, which are operated by two 1500-hp. General Electric motors and are of the National Roll & Foundry make. There are also 20 stands of cold rolls furnished by the Hyde Park Foundry & Machine Co., and driven through a Falk gear by a General Electric 800-hp. motor. The top roll of the roughing mills is driven by an independent motor with a reduction gear connection, thus doing away altogether with pinions and top spindle drives. This device is the invention of Joseph Hirschmann, the engineer who built the plant.

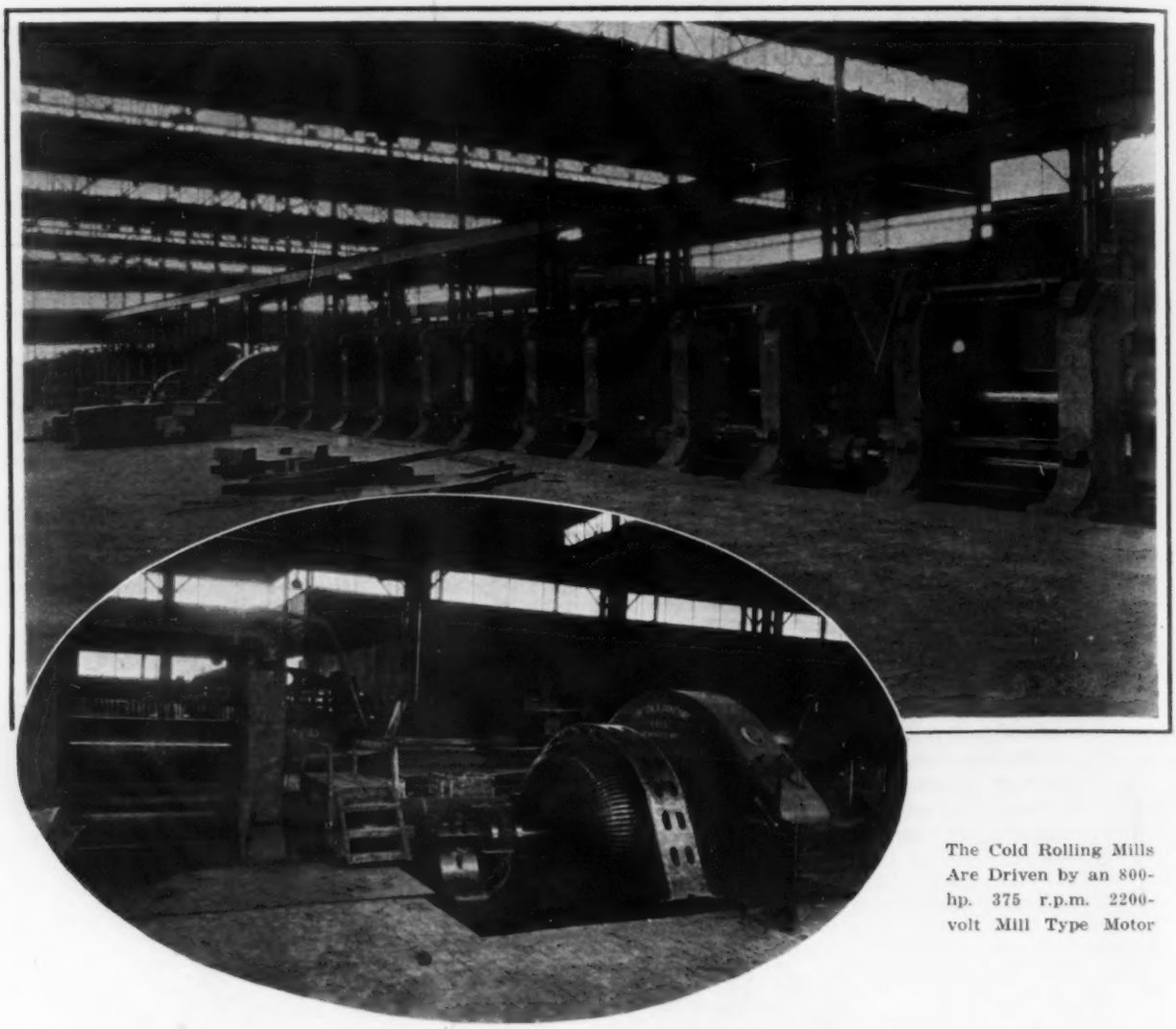
All the mill buildings cover an area of 375 x 1000 ft. with the main bays of 80-ft. span and are of all-steel construction with roof of the Aiken type (high and low trusses with provision for greatly increased window space and ventilation, thus to provide a cool interior).

The mill is equipped with nine Chesapeake cranes, one of 5 tons, two of 10 tons, two of 15 tons, three of 25 tons, and one of 35 tons. Railroad spurs on both sides of the building give provision for unloading raw products and removing the finished steel. When working to capacity the mill is designed to turn out 6000 tons a month. Sheets are being made in widths of 18 in. to 48 in. and lengths up to 144 in.

As a nucleus for its working organization 90 per cent of the skilled men have been brought in from the Pittsburgh and Ohio districts. The remainder of the 1200 employees, when the plan is in full operation, come from Baltimore and vicinity. J. M. Jones, president, declared a first class type of workmen has been ob-



The Hot Mill Is Driven by a 1500-hp. 250 r.p.m. 2200-volt Mill Type Motor



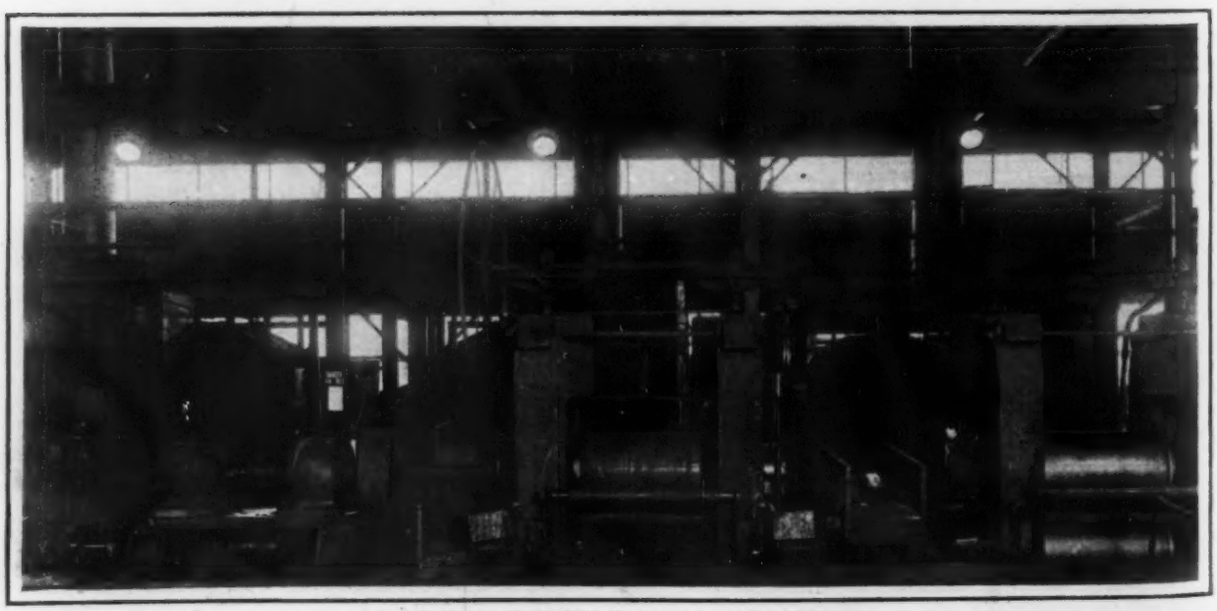
The Cold Rolling Mills Are Driven by an 800-hp. 375 r.p.m. 2200-volt Mill Type Motor

tained and no housing troubles have been experienced.

The yard for storing sheet bars is in the southwestern corner of the hot-mill building. One of the railroad spurs runs directly into this part of the building, so that the raw material can be moved with ease to the mill floor.

There are 36 mill furnaces of George Hagan Co. make. They are stoker fired and equipped with pushers for charging the sheet bars. Of four Mesta picklers one is employed to treat the bars before heating. A steam power plant consisting of two 250-hp. Heine boilers with brick stack 150 ft. high furnishes steam for the picklers and the acid vats.

The twelve stands of finishing mills are two-high 30-in. diameter rolls 34 to 54 in. long, contained in massive housings each weighing 42,000 lb., with screws 9 in. in diameter. The rolls are of chilled iron each weighing 15,000 lb. and equipped with a steam spraying and other devices for controlling the temperature of the rolls. The mills are mounted on massive con-



Balance Sheet Mill Drive of the Hot Mill

Annealing Department of the Eastern Rolling Mills

crete foundations supporting the cast iron shoe plates, which weigh 650 lb. per ft.

The two 1500-hp. General Electric motors which drive the hot mills operate at 250 r.p.m. and take 2200-volt alternating current. They are equipped with cast-iron bases and two steel-mill pedestals for carrying the bearings and are connected to the mills through single reduction Mesta made gear drives. The control for the motors is of the reversible automatic type, providing seven automatic current limit accelerating points and one plugging point (for quick stopping), both forward and reverse.

Maximum torque push buttons are provided, the use of which causes the proper contactors in the secondary circuits of the motors to close, thus enabling them to develop maximum torque at standstill in case the motors are stalled when trying to start with cold pieces of metal in the rolls or under similar cases of obstruction. An independent "stop" push-button station is employed from which the equipment may be shut down on occasions of emergency.

The annealing furnaces are of the double type, six in number, affording a capacity for 24 sheet annealing boxes. The cold roll department consists of 16 sets of finishing and four sets of flattening rolls made by the Hyde Park Foundry & Machine Co., and driven through a Falk gear by an 800-hp. General Electric induction motor. The cold rolls are 26 in. in diameter and the housings for these rolls weigh 10 tons each.

A mechanical department consisting of machine shop, blacksmith shop and electric shop and equipped with tools and machines for performing all necessary repair work is on the north side of the cold rolling mill. The mill equipment also includes two scrap bundling presses made by the Galland-Henning Mfg. Co., a 140-in. Hyde Park hot-mill shear, and a 144-in. Hyde Park shear for cutting cold sheets. Besides the large motors for operating the cold and hot mills previously mentioned there are 100 other General Electric motors. A prominent feature of the installation is that all of the motors in the mill are equipped with automatic starters and push-button stations. The substation equipment includes three 1667-kva. 3 phase, oil-insulated, self-cooled transformers, 13,200-2300-v, 25-cycle; three 200-kva, single phase, 25-cycle, 13,200-460-v transformers, three 25kva, single phase, 25-cycle, 13,200-115-v, lighting transformers; one 300-kw., 750 r.p.m., 250-v compound wound rotary converter, six-phase, with three 100-kva, 13,200-v-185-v transformers and one 5½-kw. motor generator for charging the storage batteries used in the operation of the oil switches, all of which are solenoid operated, remote control. A 22-panel switchboard completes the installation of the substations. All of the equipment is of General Elec-

Pickling Department of the Eastern Rolling Mills

tric make. The Eastern Rolling Mill Co. is capitalized at $5,000,000, of which $3,000,000 has been issued. J. M. Jones, president and general manager, was formerly president of the Baltimore Sheet & Tin Plate Co., which was bought by the Bethlehem Steel Co., with which he served as general manager of its sheet and tin plate department at Sparrows Point. Previously Mr. Jones was vice-president and general manager of the Massillon Rolling Mill Co., and at one time was general manager of the Lalance & Grosjean Mfg. Co., Harrisburg, Pa. Other officers are: C. E. F. Clarke, vice-president; L. J. Jones, secretary; J. A. Downey, treasurer; C. A. Pennock, general superintendent; J. E. Cook, assistant general superintendent; A. J. Hazlett, sales manager, and H. A. Thompson, assistant sales manager. The following constitute the board of directors: J. M. Jones, Waldo Newcomer, F. B. Cahn, F. W. Wood, L. J. Jones, J. T. Hill, C. C. Pusey, all of Baltimore; J. E. Aldred, C. E. F. Clarke, R. M. Smith of New York; and A. W. Thompson of Pittsburgh.

COAL-DUST HAZARDS

Causes of Explosions in Industrial Plants—Preventive Action

Since the introduction of pulverized coal as a substitute fuel for natural gas in the various types of heating furnaces used in steel mills, a number of fires and explosions have occurred, resulting in the loss of life and property. L. D. Tracy, of the Bureau of Mines, has completed investigations of plants where such explosions occurred, with a view to learning causes and preventing future accidents.

What the Investigation Showed

A lack of knowledge of the explosive and inflammable qualities of pulverized coal was found to exist among some of those employed about the furnaces. Investigations revealed that a small stream of pulverized coal leaking from a defective joint in a coal transport line did not attract much attention, although if the dust cloud should come in contact with an open flame or hot metal the effects would be as disastrous as if it had been gas.

Experiments also demonstrated that a mixture of 30 per cent pulverized coal dust and 70 per cent of finely powdered shale is explosive. This is analogous to conditions which may be found in industrial plants, as they show that coal dust which may have settled on the floors and girders of buildings is not necessarily rendered inert by the incombustible matter with which it may have become mixed.

One of the most serious troubles with which users of pulverized coal have had to contend has been the prevalence of fires in storage bins for pulverized coal. It has been somewhat difficult to determine the exact cause of these fires, but undoubtedly spontaneous combustion has played an important part in the origin of some of them.

In some of the systems used in drying and pulverizing coal, the fine coal, about 90 per cent of which will pass through a 100-mesh screen and 70 per cent through a 200-mesh screen, is delivered to the storage bins at a temperature of 125 to 130 deg. F. It is possible, however, for the person running the drier to permit the fire to become hotter than normal and thus overheat the coal in the drier. The coal may be thus delivered to the storage bins at a temperature at or above 150 deg. If left in the bin for a comparatively short time, it is very probable that the temperature of the coal will rise to such a point that when mixed with air the coal will burn rapidly.

Overheating of the coal is especially likely to happen in the type of drier known as "direct heat" drier, where the fire on the grates is permitted to continue after the drier has stopped running.

What the Safeguards Are

In connection with the foregoing the following suggestions are made by Mr. Tracy: Care should be taken that pulverized coal is not delivered to storage bins at a high temperature. Storage bins for pulverized coal should not be placed in any position where they may become heated from furnaces, steam pipes or hot flues. If a plant has been shut down for several days, delivery of coal from the storage bins through transport lines to the place of consumption should not be permitted before the temperature of the coal is taken. This can be done by pushing iron rods into the interior of the stored coal.

It is of extreme importance to see that no opportunity is given burning particles to get into the transport line, either from the storage bin or by a "backfire" from the furnace. Frequent inspection should be made of the burners and any coked particles thereon should be immediately removed. As often as practicable, at night when the plant closes down if possible, all furnaces should be cut off the supply line, the gate from the pulverized fuel bin closed and the transport line thoroughly cleaned by allowing the fan to force a current of air through it until all the pulverized coal is blown out.

Where furnaces are equipped with individual fuel bins and the coal is delivered into the primary air line by means of screw conveyors, the fuel bins should be placed away from the furnaces. Every effort should be made to prevent any accumulation of dust in the building that houses the pulverizing apparatus. Certain manufacturing plants, in which explosive dust is prevalent, have installed vacuum cleaners to keep the buildings free from dangerous quantities of explosive dusts. In examining storage bins and other places where coal dust may exist, an electric light, protected by a wire guard, should be used.

To obtain the best results, as regards safety, in the use of pulverized coal as a fuel in industrial plants, it is important that both officials and men be educated to the idea that coal dust is explosive and therefore dangerous; and that under certain conditions it will ignite as readily as gas.

Organization of Technical War Service

In connection with the organization, under the direction of General Pershing, of the reserve armies of the United States, it is proposed informally to associate members of the Army Ordnance Association and the ordnance officers of the Reserve Corps. The Army Ordnance Association, of which Benedict Crowell is president, has as members some 2400 technical and business experts who, during the war, served either as officers of the Ordnance Department or as executives of industries engaged in ordnance manufacture. There will be a meeting at the Engineering Societies' Building, 29 West Thirty-ninth Street, at 8 p. m. June 15, to form in Greater New York a local organization of the Army Ordnance Association which shall include as members all ordnance officers of the Officers' Reserve Corps. All who served as officers in the Ordnance Department during the war, and all who are interested in ordnance as a factor in preparedness, are invited to attend.

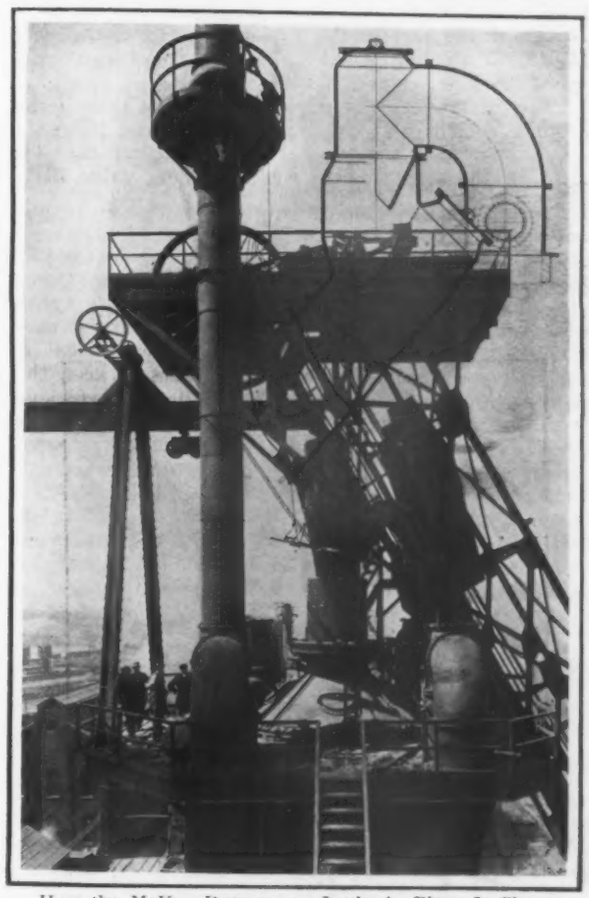
A modern and completely-equipped club house and recreation grounds for the employees of the Electric Storage Battery Co., Philadelphia, are nearing completion. The employees will assume entire charge and responsibility for the club house and grounds, including the cost of maintenance. The equipment will provide for sports, entertainments, social gatherings, educational features and dining. The site is picturesque and the company has added artistic features.

The annual meeting of the National Sheet Metal Contractors of the United States will be held at the Fort Pitt Hotel, Pittsburgh, June 14 to 17, inclusive. The convention committee includes Louis Luckhardt, W. C. Markle, W. F. Angermeyer, W. J. Fortenbacher, E. W. Scarborough, S. N. Wilcox, D. E. Kendig, W. H. Scholes, J. S. Dougherty, John Graff and W. J. Keist.

New Type of Downcomers

A new type of downcomer has been patented by Arthur G. McKee & Co., Cleveland. It is noteworthy for being low and compact, as indicated by the accompanying drawing and the reproduced photograph of one of the actual installations.

The gas and particles of stock travel initially in the direction of the inclined outlet from the furnace, but the gas must then turn at a sharp angle from this direction in order to enter the vertical branch. Moreover, this gas must pass the baffle as indicated in the drawing. It has been demonstrated that the fine material, except the very small particles, strikes the end of the inclined pipe and rolls back into the furnace. It has been found in other words that the diverted flow of gas has not sufficient carrying power to cause a



How the McKee Downcomer Looks in Place Is Shown and the Phantom Drawing Shows It in Cross-Section

change upward from its original direction of the fine stock in suspension.

The high downcomer was of course constructed to reduce to a minimum the amount of stock thrown out of the furnace, especially during slips. The McKee company emphasizes that in comparison with the new downcomer the high types are expensive in material and construction and in obstructing the space on the furnace top, and they perform their service of reducing the amount of material lost by forcing the stock to travel upward as far as practicable—in short, depending on the length of the upward movement to bring about a gravity separation.

Completes Purchase of Steel

The American-Foreign Steel Corporation, Grand Central Terminal Building, New York, announces that it has completed the purchase of all the steel remaining in the United States, which was purchased for export to France during the war, consisting of billets of various sizes, sheet bars, rods, angles, beams, steel bars, plates, puddled iron, Bessemer and foundry pig iron, etc., amounting in all to about 70,000 tons. The material is located at Marietta, Baltimore, Army Base-Norfolk, Army Base-Kearney, and other Atlantic seaports.

Cost of Living Declining

Figures of the Bureau of Labor Statistics show that, while rents in May were higher than at any time during 1920, all other items of the family budget have decreased. The report is for five cities—New York, Chicago, Philadelphia, Detroit and Cleveland—having, in 1920, a total of 11,936,051 inhabitants, or 11.3 per cent of the population of the United States. Averages for these five cities show that food, clothing and house furnishings were higher last June than in any other month quoted; while fuel and lighting and the miscellaneous list were highest in December. Basis is 100 for December, 1914.

Item	Per Cent of Total Expenditure	Index of Expenditure June, 1920	Dec., 1920	May, 1921
Food	38.2	216	172	140
Clothing	16.3	312	275	237
Housing	15.3	142	163	171
Fuel and light	5.2	171	193	184
Furniture, etc.	4.9	289	276	235
Miscellaneous	20.1	212	223	221
Totals	100.0	220	204	183.6

Duplex Planing Tool

A tool for metal planers containing two regular high speed tool bits and so constructed that a chip can be cut, not only during the regular cutting stroke but also during the return stroke has been placed on the market by the Waltham Machine Co., Waltham, Mass. This tool, known as the Dusenbury duplex planing tool, is used to equal advantage in the different operations of planing, such as horizontal, vertical, or inclined surfaces, also slots and dovetail bearings.

The position of the tool bits is such that the result is the same as that which is obtained when using an underhung tool. All surfaces subjected to wear are hardened. To use the tool, the planer clapper must be fastened down. The recommended practice is to put a taper pin through both the clapper box and clapper, near the lower end. By so doing the planer head is in no way injured and the taper pin is easily removed when required. Another way, when the planer has not been drilled and reamed for pin, is to clamp a Dusenbury clapper bracket under the clapper box swivel, clamping bolts and tightening a jack screw brace between the bracket and the lower tool clamping strap.

Two High Speed Tool Bits Are Used, the Cutting Being Done on Both Forward and Return Stroke

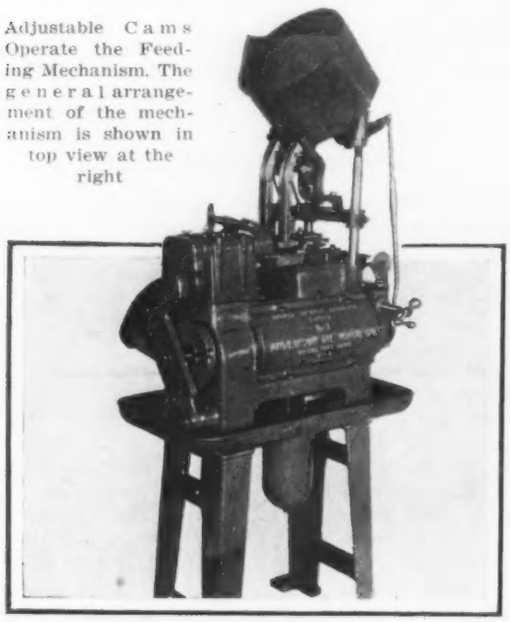
The tool bits, set facing each other, are clamped in two opposed clappers hung in the tool head, which can, when the bind nut at the top of the tool shank is loosened, be swiveled in a sidewise direction and by means of the adjusting screws which bear against the graduated foot of the tool shank, any desired position is obtained. This motion swings the cutters by each other and the amount they are moved regulates the thickness of the chips and the amount of feed needed, so that each tool will have an equal cut or one may be given a heavy roughing cut and the other, set slightly lower, a light one for finishing.

All parts of the tool are case hardened and are interchangeable.

Automatic Nut Tapping Machine

The Anderson Die Machine Co., Bridgeport, Conn., is putting on the market a double spindle automatic nut tapping machine which represents a departure from previous designs. Instead of the clutches, a gear segment meshing into a train of gears and oscillated back and forth by a crank motion is used for advancing and reversing the tapping spindles.

The throw of the crank is adjustable to give any desired number of revolutions to the spindles in either direction, within the capacity of the gear train and the length of segment. The machine illustrated is geared to give 15 revolutions of the tap, which on a 32 pitch tap will give at least 10 complete threads through a thickness of 5/16 in., although the machine is designed and built for use on work not exceeding 3/16 in. The crank motion which controls the oscillation of the segment should never be any greater than actually necessary for the complete tapping of the nut.



Adjustable Cams Operate the Feeding Mechanism. The general arrangement of the mechanism is shown in top view at the right

The crank disk is mounted on the horizontal shaft running through the machine and is driven by a worm gear inclosed in an oil-tight case, the worm being driven by a constant speed motor running at 1750 r.p.m. The horizontal shaft and crank runs at 56 r.p.m., the spindles completing 56 cycles per min. which for two spindles gives 112 pieces tapped per minute. In machines intended for work up to 6/32 in., in brass, a worm and wheel can be furnished to give 68 cycles or 136 pieces tapped.

The horizontal shaft carries the cams for operating the feeding mechanism. The cams are adjustable so that the machine may be timed accurately and as the cam and crank disk are on the same shaft the timing of the feed with the direction of rotation of the spindle will remain accurate. The hopper will feed either hexagon or square nuts. Push rods carry the nuts from the feeding position in the chutes into engagement with the taps. The construction of the chute is intended to eliminate possibility of nuts leaving the chute until they are completely tapped. The hopper is provided with an agitator in the form of a disk which oscillates through a crank motion mounted on the horizontal shaft. A vibrator is also provided to prevent the nuts from sticking in the chutes during transfer.

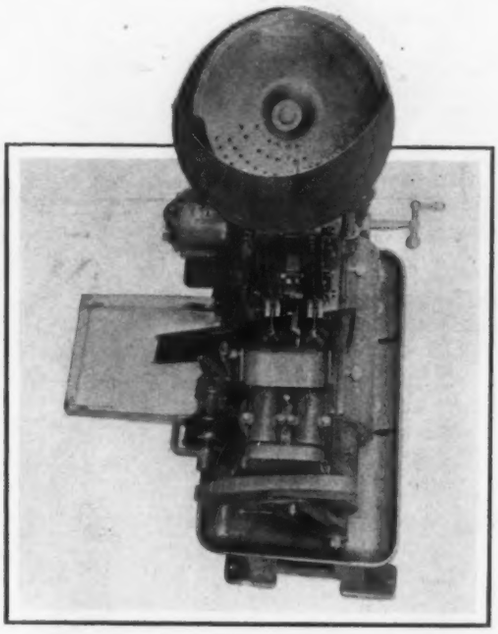
The machine will tap square or hexagon nuts ranging from 3/16 to ⅝ in. across flats and from 1/16 to 3/16 in. in thickness, from the smallest diameter tap up to 10/24 without providing special chutes and at the rate of 112 pieces per minute. No special taps are required. In tapping nuts of various sizes the only change necessary is in making two small blocks that form the entrance for the nut into the chutes, two push rods of cold rolled steel ⅝ in. square and approximately 4 in. long, and two fingers that hold the nut while it is being transferred from the feeding position of the chute into engagement with the tap.

The machine is driven by a ¼ hp. standard motor, alternating or direct current. The floor space required is 18 x 24 in.; the height from floor to spindle being 43¼ in., and the overall height, 66 in. An oil pump and reservoir are built into the machine. The net weight is 500 lb.

British Trade in Machine Tools

The British Board of Trade has issued a report on that country's export and import trade in machine tools, showing that exports for the first three months of this year were the largest on record for any similar period, greatly exceeding the pre-war average. The total weight of the machine tools exported from Great Britain in the first quarter was 7231 tons and the value £1,046,605 sterling. The 1911-1914 pre-war average was 3826 tons, value £232,964 sterling.

The total tonnage of imports during the same period dropped considerably from preceding years, though it was greater than the pre-war average of imports. The total for the three months was 1454 tons, value £377,-



447 sterling, compared with 3171 tons, value £705,226 in the corresponding period of 1920. The pre-war average, 1911-1914, was 828 tons, value £80,335.

Trade Commissioner Wilbur J. Page, in transmitting this report from London to the Bureau of Foreign and Domestic Commerce, comments as follows on the report: "In these days of trade depression it comes as rather a surprise to note the strides which the British machine-tool industry is making in the expansion of its export market. The statistics indicate that Great Britain has not only regained all lost ground in the production and export of heavy machines, but is also extending its trade in the finer machines, which are of much higher value per ton."

At the meeting of the Rail Steel Products Association, which includes the leading rerolling mills in the United States and Canada, held at the Hotel Biltmore on Friday, May 27, the following officers were elected: E. E. Hughes, vice-president Franklin Steel Works, president; D. E. Sawyer, sales manager Pollak Steele Co., secretary; Arthur S. Hook, vice-president Calumet Steel Co., treasurer.

The June meeting of the members of the National Association of Sheet and Tin Plate Manufacturers was held at Wheeling, W. Va., June 6 and 7. The Wheeling Steel Corporation acted as host for the visitors, and obtained for the meetings the use of the Country Club at Wheeling.

DECREASED PRODUCTION

Steel Production of Independents Less Than 20 per cent in Mahoning Valley

YOUNGSTOWN, OHIO, June 7.—Steel production with independent interests in the Mahoning Valley is less than 20 per cent of normal this week. A severe recession is noted in sheet mill production, which has declined to 18 per cent, with only 20 of the 105 mills of the Valley under power.

Grace blast furnace of the Brier Hill Steel Co. has been blown in, after a suspension of three weeks. There are now only nine stacks out of 46 pouring in the Mahoning and Shenango Valleys—two of the Carnegie Steel Co. at the Ohio Works, Youngstown; two of the same interest at the New Castle plant; two of the Youngstown Sheet & Tube Co. at its East Youngstown group, and one of the Republic Iron & Steel Co. in the Haselton group.

For the first time since the depression started, not a rolling mill of the Trumbull Steel Co. at Warren is under power. Aside from the Youngstown Sheet & Tube Co., idle the past week to a large extent and therefore under an accumulation of orders, other important independent groups are doing little better than the Trumbull interest. Only 16 of the 51 independent open-hearth furnaces are charged, or a total of 26 out of 66, including the Carnegie Steel Co. units. Six of the 17 pipe furnaces are fired; none of the four plate mills is active, while all of the independent bar mills are idle.

The Carnegie company is maintaining blast furnace, open-hearth and Bessemer production at its Youngstown district plants sufficient to support fully 40 per cent finishing schedules. The bar mills at the McDonald and Upper and Lower Union mills are partially operating.

Though the Newton Steel Co. has reduced the number of its active sheet mills from ten to eight, the company is endeavoring to maintain the same production rate on the smaller number of units. Other sheet mills are being operated by the Republic company, which has six under power at its Niles plant, and by the Brier Hill company, which has six in commission.

At its Girard plant, the A. M. Byers Co., Pittsburgh, is operating 22 puddling furnaces and a skelp mill.

Plant Operations

The Worcester Electric Tool Corporation, Worcester, Mass., which recently increased its manufacturing space, plans to expand its business 50 per cent. The company is manufacturing a combination electric drill and valve grinder.

The Universal Winding Co., South Auburn, R. I., plant has gone on full time with 1025 employees. Some departments have been on a three-day per week schedule. Prior to the business depression the company employed approximately 1600.

The new 90 x 320 ft. Smith Springfield Body Co., West Springfield, Mass., plant unit is expected to be finished June 15. When completed the plant capacity will have been increased 50 per cent. An additional 100 employees will be taken on. The company at present is employing 150 hands.

The Osgood Bradley Car Co., Worcester, Mass., has taken additional orders for more than 31-man electric cars from Detroit and Elmira, N. Y., roads at a total cost of approximately $250,000. The company now has sufficient business on its books to keep its plant running at present capacity until fall. Some 950 employees are on the payroll.

The summary of the monthly employment survey made by the Cleveland Chamber of Commerce shows a slight increase in employment in that city. On May 1 there were 20,330 employees in 41 plants engaged in the manufacture of iron and steel and their products as compared with 19,434 on April 30, or a gain of 4.6 per cent. The number of employees in eight automobile and automobile parts plants increased from 9949 on April 30 to 10,310 on May 31, or a gain of 3.6 per cent.

The Bangor & Aroostook Railroad Co., because of a decided slump in passenger and freight receipts, has suspended about 700 men for thirty days. The locomotive and car repair shops at Derby and the car repair shop at Houlton, Me., are closed, 400 men being affected.

The Belmont Stamping & Enameling Co., New Philadelphia, Ohio, which has been shut down since before the holidays, has resumed operations at about one-third of capacity.

The Western Malleables Co., Beaver Dam, Wis., manufacturer of railroad and automotive castings, shut down its plant June 1 with the expectation of resuming operations June 8 on a schedule of three days a week.

The Shenango and New Castle plants of the American Sheet & Tin Plate Co. resumed operations on June 2, after a shutdown of 10 days, 20 of the 40 hot mills at the former plant going on and 12 of the 20 at the latter plant. It is not expected that the plants will be in operation for more than a few weeks.

Says New York's Industries Have Passed Low Point

"Every New York industry under my observation is showing definite signs of improvement," states Arthur E. Allen, manager New York office, Westinghouse Electric & Mfg. Co. "These signs are faint in some cases, it is true, but nevertheless they are there. The low point has been passed.

"Practically all of the fundamental difficulties, such as the German indemnity payments, the general labor situation, and the railroad problem, are being cleared away, and in addition, there is a rapidly growing confidence in the present administration at Washington, which is a favorable factor of the greatest importance. It is, in fact, impossible to find a really threatening cloud on the horizon; and since everybody now wants to get to work, and since the need for goods of every description is universal, a speeding-up of industry is inevitable. No abrupt improvement can be looked for, but a gradual acceleration of all kinds of activity will occur until all hands should be busy by the first of the year."

All Frick Ovens Idle

UNIONTOWN, Pa., June 7.—Operations in the Connellsville bituminous coal region were marked by a further decrease during the week just closed. All Frick ovens in the region remain banked. Coal operations of The H. C. Frick Coke Company are maintained at about 40 per cent, a large percentage of this being from the by-product fields in the Southern Connellsville region.

W. J. Rainey, Inc., which has been operating at 80 per cent coke and 100 per cent coal, had a one-day lay-off this week at its coke plants. Coal operations were continued unchanged.

Only a very little coal for lake trade has gone out of the region this season, but such shipments have been almost completely suspended.

Smoke Prevention Association

The appointment of a public service committee to compile information relating to smoke abatement and to disseminate such information monthly to smoke prevention officials in every city in the United States and Canada was decided upon at the fifteenth annual convention of the Smoke Prevention Association, which met at Hotel Statler, St. Louis, May 31 to Jun 3.

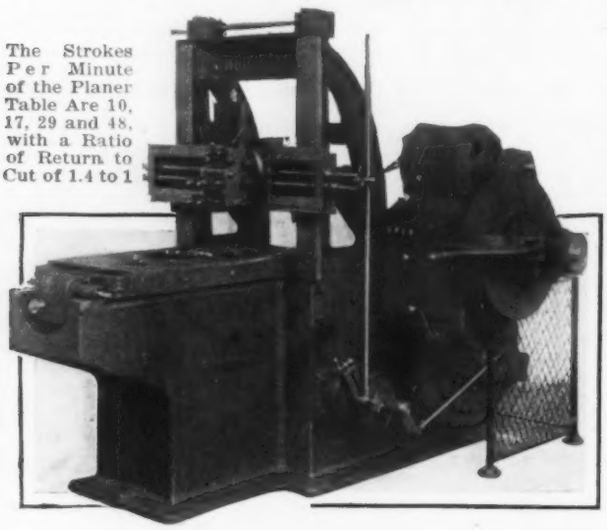
Joseph M. Lonergan, chief sanitary officer of New York, president of the association, in opening the convention, said that during the war a laxity of enforcement of all regulatory laws became apparent, but that now a period of readjustment is at hand and that old safeguards built around health, life and property are again being sought out to exercise a controlling effect upon the unrest under which the country and the world at large is laboring.

The New Britain Iron Works, New Britain, Conn., has been sold at public auction to Bernard Miller of that city.

Crank Planer

A 24x24x24 in. crank planer, particularly adapted to forge shop work on such pieces as die blocks, rod straps, gibs, shoes, wedges, crossheads and slide valves, has been recently put on the market by the Woodward & Powell Planer Co., Worcester, Mass.

Massive and well ribbed construction of the bed, housing and crossrail is incorporated to insure ample rigidity, and the table has been given large bearing surfaces on the top of the bed and is gibbed its full length. The arch rests on and between the housings which are lipped on the bed. The stroke is adjustable by a removable crank operating a screw in the crank disk. Any length of stroke up to 24½ in. can be taken over any portion of the table, the position of the stroke being adjusted by means of a shaft located at the front end of the table. This adjustment can be made while the table is in motion. The machine can also be furnished with a stroke of 28½ in.



The Strokes Per Minute of the Planer Table Are 10, 17, 29 and 48, with a Ratio of Return to Cut of 1.4 to 1

The head is graduated in degrees and can be swivelled to either side for angular planing. The crossrail gibs are secured by nuts upon studs which are threaded into the rail and the rail screw and rod are squared at both front and rear ends to take a crank. The feeds for cross, vertical and angular travel are operated automatically by power or by hand and, taking place on the return stroke, do not require a longer stroke than is necessary for the cut.

The drive is by pulley connected to a four-speed gear box or by a 5 hp. motor mounted on top of the gear box with a pinion on the motor meshing with a gear on the gear box as shown in the accompanying illustration. The planer can also be operated with a four-step cone pulley in place of the gear box. The handle for operating the starting and stopping clutch of a gear box driven planer also operates a brake for stopping the table when the clutch is thrown out. All gears and revolving parts are safeguarded.

The table working surface is 40x21 in. The strokes per minute of the table are given as 10, 17, 29 and 48, with a ratio of return to cut of 1.4 to 1. The floor space occupied is 80x120 in., or 70x120 in. depending on the type of drive; and the weight is given as approximately 8,000 lb.

A contract has been signed by Topping Brothers, heavy and marine hardware jobbers, 122 Chambers Street, New York, with the White Construction Co. for the erection of a four-story and basement reinforced concrete warehouse and office at Varick and Vandam streets. This building will have 67,000 sq. ft. of floor space, according to the present building plans, and will be constructed so that three additional stories may be added. A feature will be a 30 x 70 ft. loading platform inside the building to expedite the handling of pick-up orders for city deliveries among the trade. Topping Brothers have been located on Chambers Street for 36 years.

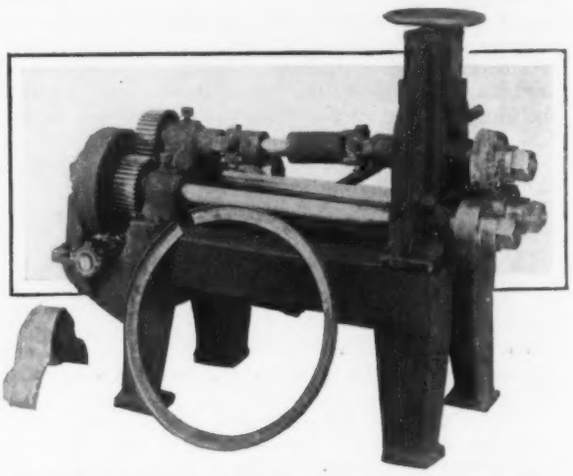
Regional Meetings of Machine Tool Builders

Regional meetings of the National Machine Tool Builders' Association held at Boston and Worcester, Mass., and Hartford, Conn., June 1, 2 and 3, respectively, were well attended in each instance. At each meeting Ernest F. Du Brul, general manager, with the aid of charts, covered in a general manner the relation of price movements, demand for and production of various commodities and applied the same principle, as far as is possible, to the machine tool industry. He stated prices for machine tools necessarily must be governed entirely by individual conditions bearing on the individual line of machinery produced. The maintaining of high prices on a fictitious basis invites competition and Mr. Du Brul believes it equally unwise to cut prices without a thorough knowledge of the relation of such action to the cost of doing business. The real purpose of these talks was to show what the association is endeavoring to accomplish in the matter of securing statistics which will have some value to the members.

It was pointed out the task of compiling statistics costs money and the question of an increase in the annual dues of the association was discussed. Nothing definite has been decided which will increase the revenue of the association. General opinion among those attending these New England meetings appeared to be that the association is accomplishing something of real value. The regional meeting idea was endorsed.

Ring Coiling Machine

A new adjustable coiling machine for the manufacture of rings and coils to various diameters has been recently put on the market by the Wallace Supplies Mfg. Co., Orleans Street, Chicago. The machine is known as the No. 3.



Ring Coiling Machine on Which Angles 2 x 2 x ¼ in. Can Be Bent Cold to a 30-in. Diameter Circle

The rolls are removable and can be arranged to suit the section of the material that is to be bent, viz.: pipe, angles, channels, tees, squares and other sections. The machine may also be used for manufacturing spirals out of reinforcement bars. Angles 2 x 2 x ¼ in. can be bent cold to a 30 in. diameter circle and lighter sections can be bent to smaller diameter.

The machine is operated by a lever engaging friction clutch pulleys for forward and reverse drive. The upper roller is adjustable by means of hand screw to secure any diameter of coil desired. Rollers can be furnished for any shape or section of material. The floor space occupied is 42 x 54 in., and the weight is 1200 pounds.

The Ordnance Salvage Board of the War Department has sold approximately 211,500 loaded brass fuses to the Rochester War Salvage Co., Inc., New York, at a price of 0.06789 cents each.

AUSTRIAN MARKET

Materials Plentiful but Shortage of Skilled Help —Protective Tariff Asked

(*Special Correspondence.*)

VIENNA, AUSTRIA, May 14.—The Austrian foreign trade returns for the year 1920, recently published, reveal the rather marked dependence of the Austrian iron industry on Czecho-Slovakia. Iron ores, chiefly Styrian and Carinthian, had to be shipped to Czecho-Slovakia in return for coke for domestic blast furnaces. In machinery, the trade balance is in Austria's favor.

A time extension has been arranged for the compensation agreement with Poland until March 31, 1922. Among other things the Austrian Government pledges itself to permit the export of 35 new locomotives and 550 railroad cars, as well as to provide for the repair of 500 Polish locomotives for a period of four years. Poland is furthermore to receive 50 truckloads of magnesite.

No Iron Shortage

The demand for tariff protection by the iron industry and the rapid improvement of the iron market are the two paramount topics in industrial circles. The improvement in the iron market has been astonishing. Not only has the shortage considerably abated but there is an actual surplus of iron on the market, partly due to increased production, but more to the influx of German iron. The increase in production is attributable to the interest agreement concluded some time ago between the Alpine Montan Gesellschaft and the German Rhein-Elbe-Union (Stinnes) by which the former was insured a sufficient supply of coke to resume operations on a larger scale. Coke supplies from Czecho-Slovakia have been so large lately that acceptance has been refused of any shipments exceeding contract tonnage since the housing shortage renders employment of additional labor impossible. A housing plan running into several hundred million kronen has been drawn up, but with building costs 160 times pre-war prices and a shortage of skilled and other labor, it seems doubtful whether all plants will operate to capacity before 1922.

Tariff Protection Demanded

The improvement of the iron and steel industry has given rise to a demand for tariff protection. The steel industry is determined to maintain the present high price level at any cost and is making strenuous efforts to persuade the Government to re-establish the customs barrier which was broken down by the revolution. No attempt is being made to conceal the fact that this action is primarily directed against German iron imports.

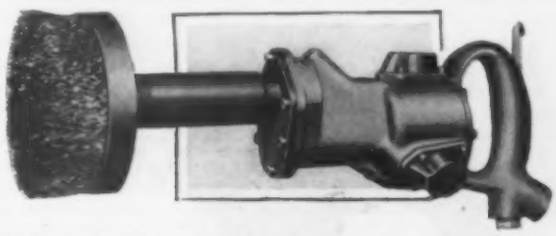
American Capital in the Machine Industry

One of the problems of the machine and engineering industry awaiting solution is the reconstruction and adaption of the former Government ordnance and war material plants, including the Vienna arsenal and other plants at Woellersdorf, Woerth, and Fischamend, all of which were converted in the spring of 1920 into the "State Industry Works." Most of these plants were erected during the course of the war and are equipped on modern lines. Operated at normal, they offer employment to more than 70,000 workers.

Some months ago, the arsenal at Vienna was converted into a communal undertaking, operating with a capital of 550,000,000 kr. and similar action will shortly be taken with the plant at Fischamend. This venture, however, will represent a combination of private and state capital. The proposed company is to be formed with an operating capital of 200,000,000 kr., of which the state will hold 80,000,000 and the remaining 120,000,000 kr. will be furnished by an American company, 20,000,000 kr. in cash and the balance in patents. It is intended to manufacture linotype machines and the American group is said to have guaranteed annual earnings of $100,000, agreeing to sell a certain minimum output for a period of 15 years. This plan by no means exhausts the productive possibilities of the plant, but nothing definite has been decided upon with a view to a 100 per cent operation.

Air Operated Wire Brush

A wire brush for use in connection with its standard No. 6 Little David drill has been recently put on the market by the Ingersoll-Rand Co., 11 Broadway, New York. The combination is intended for use in removing paint, rust, scale and dirt from tanks, steel cars, structural steel and all sheet metal surfaces. It is also



Air-Operated Wire Brush for Cleaning Paint and Scale from Metal Surfaces

said to be useful for cleaning iron, steel and aluminum castings.

The wire brush has a face diameter of 5 in., and is made up of wires of special heat treated steel. The drill has bearings to take up end thrust when pressing down on the work; and the motor is of high speed and light weight design. The weight of the drill and brush complete is 11½ lb.

No Shortage of Oil Feared

To offset recurrent predictions of approaching depletion of the oil fields of the United States, resolutions have been adopted by the Western Petroleum Refiners' Association, National Petroleum Association tion, American Independent Petroleum Association and Independent Oil Men's Association, affirming an abiding faith in a long future for the industry. After referring to the deterrent effect of pessimistic predictions, in preventing prospective consumers from adopting oil as a fuel, the resolutions call attention to new fields being developed continually, and express "confidence in the ability of the petroleum industry of the world to supply the needs of the world indefinitely. The oil-consuming world need have no more fear for the supply of oil in the future than for the supply of coal."

Interesting ancient history pertaining to iron making in Virginia appears in the April number of William and Mary College *Quarterly*, a historical magazine, Williamsburg, Va. The article is entitled "Anthony Langston on Towns and Corporations; and on the Manufacture of Iron." It was written about 1660, the original manuscript being in London, a copy of which rests in the Library of Congress and which has never been published before. The article is a prospectus of resources, equipment and men necessary for making "500 tunns of iron."

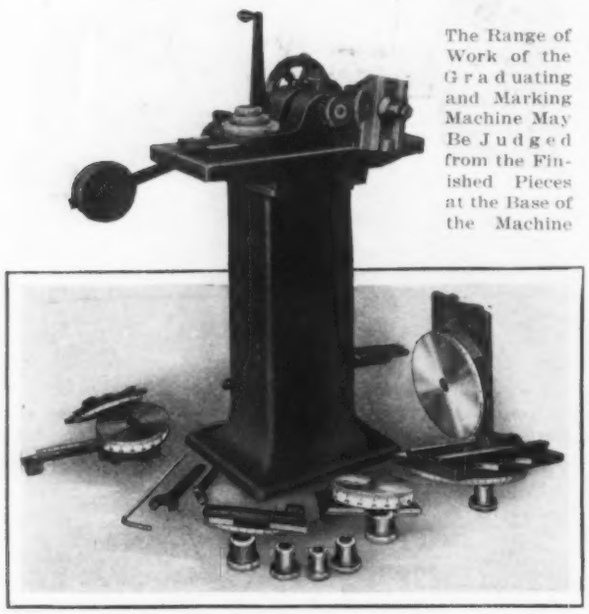
"A Method of Accounting for Scrap" is the subject of a bulletin for May of the National Association of Cost Accountants, 130 West Forty-second Street, New York. The early part of the bulletin discusses the theory of proper scrap accounting; then follows the application of the theoretical principles to four cases. On four loose bulletin service sheets are discussed the distribution of crane costs.

W. H. Weingar, representing the Pratt & Whitney Co., Hartford, Conn., addressed an open meeting of the American Society of Mechanical Inspectors at Hotel Sherman, Chicago, on June 7. His subject was "Measuring and Manufacturing in Millionths of an Inch." On June 6, he delivered the same address before the Western Engineering Societies, Rockford, Ill.

Graduating and Marking Machine

To provide for the performance of graduating operations where accuracy of the product and speed of operation are required the Noble & Westbrook Mfg. Co., Hartford, Conn., has recently developed the machine shown in the accompanying illustration.

Hand and power machines are furnished. On the power-driven machine, the placing of pieces of work in the machine and removing them when the operation has been performed, are the only duties required by the operator. With the hand machine, one turn of the handle completes the work. Provision is made for



The Range of Work of the Graduating and Marking Machine May Be Judged from the Finished Pieces at the Base of the Machine

holding the work in the proper relation to the graduating die and the depth of the marking is governed by means of a foot lever, cam and weight, which are governed by a positive stop that is adjustable to provide for making any desired depth of lines. This insures making even and accurate impressions. The machine is equipped with steel spindles, adjustable bearings, and is fully automatic in operation, being stopped by means of a clutch on the spindle which drives the marking die.

An idea of the range of work for which the machine is adapted will be gathered by referring to pieces illustrated. Parts of various diameters can be graduated by changing the position of the intermediate gear located on the adjustable sector. Practically all types of modern machine tools are equipped with micrometer adjustments, and this machine is adapted for the graduation of the dials used on micrometer adjusting screws, also graduating and numbering cross slides and compound rests for lathes. The graduating and numbering are completed in one operation.

Eugene Schneider Awarded Fritz Medal

The John Fritz Medal Board of Award has awarded its gold medal and diploma to Charles Prosper Eugene Schneider, the distinguished French engineer, scientist, and man of affairs, head of the Creusot and other works in France. The following cable has been sent to his home in Paris: "John Fritz Medal Board of Award representing national societies of civil, mining and metallurgical, mechanical, and electrical engineers, has awarded you the John Fritz gold medal for achievement in metallurgy of iron and steel; for development of ordnance, especially the 75-mm. gun, and for notable patriotic contribution to the winning of the war."

Born Oct. 29, 1868, at Le Creusot, he has devoted his life to the development of the great industries which his forefathers founded. Upon the death of his father in 1898, he became the head of the company, when only thirty years of age. He was a member of the Chamber of Deputies of the French Parliament from 1898 to 1910. He has received many honors in his own and other countries for noteworthy achievements. While in the United States in November, 1919, he was presented the gold medal of the Mining and Metallurgical Society of America.

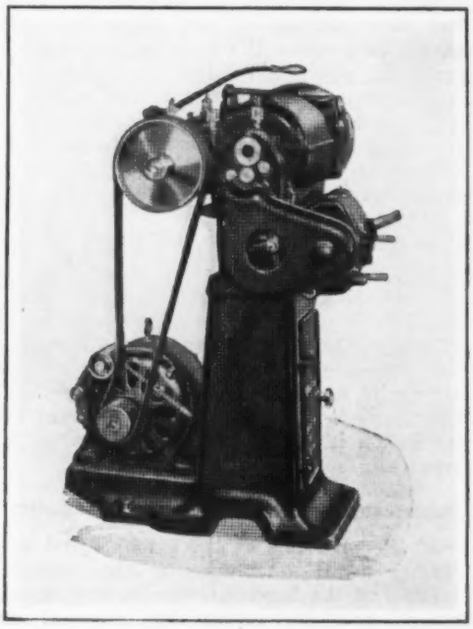
The medal and diploma will be presented to Mr. Schneider in France by a party of distinguished American engineers, who will go to Europe in June. This party is led by Ambrose Swasey, chairman of the board of award, and will include several other officers and past officers of the national societies of engineers. They will bear greetings to the engineers of England and France from the engineers of America. At a large gathering of the English engineers in London in June, the American party will present the John Fritz gold medal and diploma to Sir Robert A. Hadfield, awarded sometime ago "for the invention of manganese steel," so useful in the war and in the industries of peace.

The John Fritz gold medal has previously been awarded to sixteen eminent American and foreign engineers and scientists.

Changed Design of Economy Lathe

The Rockford Lathe & Drill Co., Rockford, Ill., has developed a geared head and motor-drive for its Economy 14-in. swing quick change lathe.

The headstock is driven by a single pulley running at 400 r.p.m. and provides twelve spindle speeds in geometrical progression with the use of but thirteen gears. These are of large diameter, wide face and coarse pitch, cut from solid steel and run in oil. Spindle and shafts are of high carbon steel, ground to size. The spindle has a special thrust bearing of alternate collars of hardened steel and bronze. All bearings are



14-In. Swing Engine Lathe with Motor Mounted on Extension of Cabinet Leg

equipped with sight feed oilers. The quick change gear box is of new design and has thirty-two changes of threads and feeds obtained through sliding steel gears and hardened steel clutches, controlled by two convenient handles in connection with tumbler.

The motor may be of any standard make, preferably of 1½ or 2 hp. with constant speed having a maximum of 1200 r.p.m. The motor is mounted on a detachable plate which is fastened to a base cast integral with the cabinet leg, driving by means of a 3-in. belt kept at proper tension by an adjustable idler pulley. The intention of this design is to provide a quiet and flexible drive, and also to eliminate necessity of removing the motor in case lifting the cover of the headstock for inspection or adjustment becomes necessary. The motor may also be placed on the floor, wall or ceiling and belted direct to headstock pulley.

Metal Jobbing Problems Discussed

General Business Situation Given Consideration by Meeting at Cleveland of Metal Branch of National Hardware Association

BUSINESS conditions were discussed at considerable length at the tenth annual meeting of the metal branch of the National Hardware Association, held at the Hotel Cleveland, Cleveland, June 3 and 4. The meeting was attended by about 100 members, including manufacturers of sheet and tin plate and hardware jobbers who handle sheet metal. The general trend of the sentiment of speakers was optimistic. The opinion was expressed that the turning point had been reached and that a slow but steady improvement in business may be looked for. However, speakers avoided predictions as to when business would again become normal.

Representatives of sheet mills expressed confidence that orders would be better during the latter part of the year and that not much, if any, decline in prices could be looked for until there is a reduction in railroad rates and until there are further wage readjustments. Some opinion was expressed that consumers thought prices are still too high and that business will not pick up until there is a change in this attitude of buyers, or prices are further reduced.

The meeting was presided over by W. H. Donlevy, of Carter, Donlevy & Co., Philadelphia, chairman of the metal branch, who spoke briefly regarding industrial conditions. He said that the readjustment in prices was a step in the right direction but the failure of this readjustment to bring out business indicates that buyers are afraid that there will be further price reductions. He referred to several factors that should result in an improvement in business conditions, particularly the good crops and the greater efficiency of labor.

A. H. Decatur, Boston, Mass., president National Hardware Association, discussed the business situation briefly. The cost of distribution for years has been greater, he said, than it should have been and this cost must come down, as selling values of products declined. He expressed an optimistic view regarding the future, asserting that the country has become almost bare of goods and that an enormous amount of money must be spent for repairs and replacements.

Campaign for Metal Roofing

The subject that brought out the greatest amount of discussion was that of a national publicity campaign in behalf of sheet metal roofing and exterior work. This was led by A. K. Raub, Raub Supply Co., Lancaster, Pa., who attributed the decline in the use of metal for roofs and exterior work in buildings to poor material and particularly poor workmanship. He declared that the people want better roofs and a campaign in this direction should be started by sending men out to educate the tinners.

H. N. Taylor, N. & G. Taylor Co., offered a resolution to be sent to the National Sheet Metal Contractors Association asking that special attention be given to the development and training of apprentices with the object of increasing the use of sheet metal products and elevating the standards of the entire industry. This resolution was adopted. Considerable discussion developed as to how a publicity campaign should be handled, as there are three interests involved, the sheet metal manufacturers, the jobbers and the sheet metal contractors. John Follansbee, Follansbee Brothers Co., said that the manufacturers had recently decided not to start a publicity campaign. After considerable discussion it was decided to appoint a committee of two distributers to confer with a committee of the Sheet Metal Contractors Association, which meets in Pittsburgh June 13, and take up the subject of publicity. F. O. Schoedinger and A. K. Raub were named as that committee.

E. T. Sproull, Trumbull Steel Co., Warren, Ohio, discussed the probable developments in the sheet metal market during the balance of 1921. In his opinion considerable brightness will develop in the steel industry before the end of the year. He said that the condition to-day is not due to the lack of demand but because of the lack of buying. Consumers are waiting for readjustments. He thought good business would be restored when people think the time is right to buy and prices are right. Considering freight rates, labor, etc., sheet mills, he thought, might make a little profit at present prices if running at 100 per cent capacity. Taking everything together he believed that the turn had been passed in the period of industrial depression and he predicted a gradual but substantial improvement over the remainder of the year. Representatives of some other sheet mills also expressed the belief that there would be improvement in business later in the year.

F. O. Schoedinger, Columbus, Ohio, presented a paper in which he compared the decline in prices of farm products with the decline in steel prices, showing that the former had declined to a much greater extent than the latter. He said that there must be a gradual deflation in prices and that when labor and freight rates are deflated, farm products will be on the same basis as pig iron.

Copper and Tin in Jobbing Trade

Considerable time was devoted to the discussion of various phases of the copper situation. An address on "The Copper Producers' Problems" was made by Thomas D'Arcy Brophy, Anaconda Mining Co., Anaconda, Mont. He said the one problem copper manufacturers had neglected was the problem of distribution and that was the greatest problem of the producers to-day. The producers had not co-operated as they should with the fabricators and the producers and fabricators had not co-operated with the distributors. The greatest demand comes from the electrical industry, and next to this comes the building industry. He stated that the manufacturers will use all their efforts to increase the use of copper, brass and bronze in the building industry, and referred to a sales promotion campaign that will be started with a view of popularizing copper in the building industry.

B. Goldsmith, president National Brass & Copper Co., Lisbon, Ohio, said that the spread between copper cakes and finished sheets is only 20 per cent greater than during the pre-war period, which he regarded as a remarkably low increase. W. D. Taylor, president of the George Worthington Co., Cleveland, declared that jobbers were not being allowed enough profit to permit them to handle copper, and similar sentiments were expressed by representatives of some other jobbing houses.

Isadore Davis, M. Lissberger & Son, Brooklyn, N. Y., protested against the proposed tariff on pig tin that is included in the pending Longworth tariff bill. Some of the tin plate manufacturers present also voiced their sentiments in opposition to a tariff on pig tin and a resolution was adopted by unanimous vote protesting against any tariff on this metal.

Exchanging Stocks Among Jobbers

A discussion of "The Position of the Distributer in the Present Market" was led by F. A. Heitmann, F. A. Heitmann Co., Houston, Texas. He said that many jobbers have large stocks and should be protected by the manufacturers. However, stocks must be liquidated. In his own town a plan of exchanging excess stocks had been placed in effect and had proved satisfactory. Under this plan jobbers exchanged surplus stocks

rather than placing new orders and in this way surplus stocks are being reduced more rapidly. He did not think that price reductions would stimulate business.

H. H. Riddle, George Worthington Co., Cleveland, said that his company had followed a similar policy in making exchanges with other hardware jobbers.

Reducing Overhead Expenses

The reduction of overhead expenses was discussed at some length, the discussion being opened by Clifford E. Pierce, Betz-Pierce Co., Cleveland, jobber in sheet iron and steel. He told how his company had cut down expenses by eliminating dead wood in labor, checking telephone calls, eliminating supplies for automobiles, etc., and reducing expense accounts. A survey of members prepared previous to the meeting indicated that overhead expenses were being reduced by reductions in salaries and wages, increased efficiency, elimination of bonuses and in the reduction of the number of employees.

Reports from members showed that the average overhead expenses during 1920 were 14.36 per cent on selling price and 16.79 per cent on cost price. During the first four months of 1921 the overhead expense was 20.05 per cent on selling price and 25.08 per cent on cost price. In this connection T. J. Fernley brought up the subject of high hotel rates and said that a great deal of the overhead expense could be cut down by securing a reduction of these rates. Steps that are being taken to attempt to induce hotel proprietors to reduce rates were referred to.

Zinc Roofing

E. H. Wolff, Illinois Zinc Co., Peru, Ill., read a paper on zinc roofing in which he gave a brief history of the zinc industry. He said that more zinc is being rolled in Europe than in this country and that it is being used very largely abroad for roofing purposes. In the past there has been a lack of education on the subject of zinc roofings, but now the zinc manufacturers have an organization, plan to do educational work and will distribute a zinc users' handbook. He said that producers are now doing more to meet the demands of consumers than formerly. Zinc is being used for more purposes, and manufacturers are making zinc of different qualities to meet requirements. Corrugated zinc sheets are now being made in all sizes. He exhibited a zinc shingle which his company is just bringing out and which will be sold through the jobbing trade.

It was decided to appoint a committee of distributers and manufacturers of sheet copper in order to effect a closer co-operation between the two interests and to see if a larger commission on sales cannot be secured for the jobbers.

H. H. Riddle led in a discussion on the subject of equipping salesmen with sales information. In his opinion something should be done and done quickly to educate salesmen. Various plans he suggested included talks by manufacturers, visits to manufacturing plants, the use of house organs and bulletins. He said that his company recently took 25 salesmen to a manufacturing plant, showed them the processes and the results have been very effective.

A statement was made during the discussion that best results can be obtained by calling in salesmen and keeping them posted on conditions and products and in this way keeping in closer touch with the salesmen. Clifford Pierce said a questionnaire was sent to salesmen which was found to be very effective. If the salesmen did not answer the questions properly they were corrected, and in some cases salesmen supplied information that was not known by the men higher up in the organization.

The following new members were elected to the metal branch: Peck-Stow-Wilcox Co., Cleveland; J. M. & L. A. Osborn Co., Cleveland; National Brass & Copper Co., Lisbon, Ohio; Superior Sheet Steel Co. and Eller Mfg. Co., Canton, Ohio; Faible & Co., Philadelphia. The arrangements for the Cleveland meeting were under the direction of a local committee, of which Clifford E. Pierce was chairman. The entertainment was limited to an informal dinner and theater party Friday evening.

Heat Treatment of Ordnance and Locomotive Forgings

Speaking at a meeting of the Washington Chapter of the American Society for Steel Treating, May 19, at the Harrington Hotel, Washington, P. E. McKinney, metallurgist Washington Navy Yard, discussing "Heat Treatment of Ordnance Forgings," called attention to the inadequacy of the ordinary inspection reports covering surface conditions of the metal and chemical composition in defining the quality of steel for high-grade forgings. Melting and forging records of an electric furnace heat of chrome-nickel steel having an abundance of non-metallic inclusions and of inferior physical properties, but within the requirements as to composition and surface, were shown. Examination of the melting chart revealed unsatisfactory slagging conditions which at once characterized the metal as questionable.

A few of the factors having serious bearing on the quality of steel and which are not apparent from a casual examination of raw material inspection reports were given as follows:

Method used in refinements of steel.
Metallurgical control of conditions of slag.
Methods of introducing ferroalloys, degasifying agents, etc.
Condition of metal previous to tapping from furnace.
Temperature of metal during refining and finishing.
Size of nozzle used in teeming of ingots.
Method of pouring ingots.
Size of ingot used for given purpose.
Type of ingot used as regards chilling effect, etc.
Rate of speed in pouring ingots.
Temperature of metal entering the ingot.
Shrinkage of the ingot on cooling.
Behavior of the ingot during solidification.

At the same meeting Lawford H. Fry, superintendent of production, Standard Steel Works, Burnham, Pa., in describing general practice in the heat treatment of wrist pins, connecting rods, piston rods and axles, in a paper, "Theory and Practice in Quenching Large Locomotive Forgings," also emphasized the importance of "pre-natal" influence on the quality of finished product.

Data were given relating to the rate of heat dissipation in various quenching media, as follows:

	B.t.u. Contracted per Sq. In. of Surface per Min.
In air	1.0
In heavy oil	2.7
In cutting compound	3.0
In light oil	3.6
In water	7.0

While these average figures hold for both large and small sections, the hardening is dependent upon the rate of temperature drop. Vigorous circulation of the quenching bath not only materially cuts down the time of cooling but may result in greatly improved elastic properties.

At the next meeting of the Washington Chapter, June 17, Enrique Touceda will be the principal speaker and will discuss malleable iron.

Judge Cochran, in the United States District Court at Covington, Ky., issued an order, in a suit filed by the Houston, Stanwood & Gamble Co., machine tool manufacturer, against Harry Meyers and other members of the machinists' union, which prohibits pickets from being stationed at the company's plant at Covington, Ky., interfering in any way with the present employees of the company or congregating of former employees, or anyone representing them, near the plant. At the preliminary hearing some time ago on the application for the injunction, Judge Cochran ordered that two pickets would be permitted to patrol the vicinity of the plant.

To Determine Status of Trade Associations

National Administration Will Not Tolerate Violation of Law, but Will Encourage Proper Activities—Statements by Secretary Hoover and Attorney-General Daugherty

WASHINGTON, June 7.—Clear understanding of the legal status of trade associations and trade institutes, such as are common to all important industries of the United States, is being sought by the Harding Administration as one of the underlying motives of the Department of Justice in announcing last week that those which engage in so-called "open price" practices will be prosecuted. That legitimate organizations will not be molested, but rather may be encouraged by the Government, it is desired to establish a plain distinction between those which are and those which are not operating within the law. In order to dissipate any alarm that business interests may have exhibited over the policy of the Administration, statements have been made both by Attorney General Daugherty and Secretary of Commerce Hoover that the great majority of such organizations are both complying with the law and rendering a national service. But there is at the same time a well-fixed opinion on the part of the Administration that a small minority of national associations which, encouraged during the war to gather statistics as to prices, stocks, consumption and related facts, and for other purposes, have continued the practice and are making use of the data for their own purposes to the detriment of the public interest. It is the latter which will be the subject of legal proceedings.

There is the old question, however, of drawing a difference between practices that constitute violations and those which do not. The so-called "twilight zone" enters into the situation and the Administration is endeavoring to have it defined clearly, precisely as has been attempted in the past, but so far without the desired degree of success.

Secretary Hoover issued a statement advocating that Congress empower the Federal Trade Commission with the constructive function, subject to review by the Attorney General, of removing the uncertainties from the mind of business "between the field of co-operation for promotion of production and trade in public interest and the field of practices against public interest." Attorney General Daugherty, pointing out that investigations of the associations have been conducted and that while it was not the policy to institute a general dragnet, those which are thought to be violating the law will have proceedings brought against them in courts. It was stated that practices and plans of associations which gather trade information are being inquired into for possible violation of federal statutes. The Attorney General said there are about 400 such associations. Of these 100 are reported to be under scrutiny. The Department of Commerce, Secretary Hoover said, wishes to co-operate and assist with all which are performing a public service as against "a small minority who have degenerated into ways that make for restraint of trade."

Cases Pending in Courts

Aid in ascertaining the differences between violation of and compliance with the anti-trust laws is hoped for from pending decisions by the United States Supreme Court in the hardwood lumber case and by a federal court in St. Louis in the yellow pine case.

While certain so-called "open price associations" are to be the object of action by the Department of Justice, which has not revealed the names of any in mind, other organizations also are under investigation.

"What the department intends to do," said Mr. Daugherty, "is to proceed vigorously against those classes of business which are violating the law. The department will begin its actions against violators by selecting a particular association which it holds is violating the law. The department will agree upon this procedure within a few days. I shall not name the association that we have in mind. Our steps may include both the bringing of indictment and the filing of a bill under the civil statutes."

This statement of the Attorney General was made following the cabinet meeting on Tuesday of last week, when discussion was made of the Administration policy as to its attitude against combinations which are said to still maintain "open price" arrangements for the interchange of information such as was put into effect during the war. The fact that such practice was encouraged during the war, Mr. Daugherty said, does not mean that the Administration must acquiesce in its continuance. The view was expressed by the Attorney General that while such a practice may have served a good purpose during the period of the war, the effect now is to stifle competition and to result in unfair prices being charged to consumers. While there might not be definite agreements, he stated, "a wink of the eye and a nod of the head" were sufficient to accomplish the result desired.

Comprehensive Statistics

Mr. Daugherty has discussed the matter with Secretary Hoover, who is holding a series of conferences with representatives of leading industries in an effort to obtain their co-operation in the publication of comprehensive trade statistics by the Government, and that information and advice on the subject had been exchanged. Data given the Department of Commerce at these conferences are treated as confidential as to names of producers, etc., and will be used to aid both the Government and business, it is stated, as a guide to conditions in given industries and methods for promoting them for producers and consumers alike.

Mr. Daugherty said that it still is the policy of the Department of Justice, as was pursued under the Wilson Administration, to encourage the discontinuance of alleged violations by voluntary action, among associations, with a view to keeping at a minimum the amount of litigation brought by the department. He said that there are many instances reported to the department of such practices being discontinued. There is no intention, he stated, on the part of the Government to attack business associations, but there is considerable doubt, due to conflicting court decisions, as to how far business men could go in their organizations without violating the laws. He added that the object of the movement by the Department of Justice is to have the law definitely determined so that both the Government and the business men would know where they stand.

Secretary Hoover's Views

The attitude of Mr. Hoover accords with that of Mr. Daugherty, as denoted by the following formal statement issued by the former:

> The relations of trade associations and trade institutes to the anti-trust laws have been discussed at great length in the Administration. Of the many thousands of such organizations there are a small minority which have degenerated into ways that make for restraint of trade.
>
> All are agreed that the purposes and actions of the vast majority of national associations are a constructive contribution of public welfare. Their activity in promotion of better business practices, advancement of technical processes, simplification of production, standardization of quality, extension of foreign trade, commercial arbitration, etc.—all make for more efficient industry and business. Many of them collect information as to the production, stocks of raw and other material, percentage of industry in active operation, total orders in hand—all of which when available to the public, contribute both to stability and the increasing efficiency of industry and to the protection of both the

smaller manufacturer and the consumer. The Department of Commerce wishes to cooperate and assist with all of this sort of effort.

A smaller number of such associations have been engaged in the collection of data on the prices for the exclusive use of their members. Some of these associations have been charged with delimiting areas of commodity distribution among their members and other misuse of information.

Whether these latter practices constitute a violation of the national anti-trust laws must be determined by the courts, and this the Attorney General is vigorously proceeding to find out.

All this raises anew the question of the authority of the Federal Trade Commission. The original conception of the commission was that it should, amongst other things, advise business men as to what constituted a violation of the restraint of trade laws, but these powers were struck out in the course of original legislation. It seems to me that the seven years' experience with the commission should now enable a reconsideration of its powers with a view to giving it a more constructive function, subject to review by the Attorney General, by which it could remove the uncertainties from the mind of business men as to the line between the field of cooperation for promotion of production and trade in public interest and the field of practices against public interest. There is nothing so destructive of business as uncertainty, and business has inherently enough to deal with, without this one.

CZECHO-SLOVAKIA DEPRESSED

Exports Decline — Labor Difficulties — Trade Agreement with Italy—New Export Association

(Special Correspondence)

PRAGUE, CZECHO-SLOVAKIA, May 18.—The depression in the Czecho-Slovakian market in the past few months continues and has even been gaining in volume of late. Mills in Bohemia and Moravia comment upon the lag in demand and the steadily declining export business to Poland and Austria. The situation is aggravated by strikes and lock-outs in the north Bohemia metal industry and the slump in production is naturally reacting upon the market. Among other works, the Iron Industry Co. at Prague has had to lay off men, declaring that it was impossible to operate collieries and smelting plants on a revenue-paying basis with the present high labor cost. Two shafts have been closed down and production at the furnaces considerably curtailed. A tendency toward wage reduction is clearly evident in the iron and steel industry, but attempts in this direction are meeting with stubborn resistance from labor, despite the fact that the level of living costs has been lowered. Practically all the larger plants are operating at about 50 per cent of capacity; several works producing for stock while others are planning to introduce part-time. The industry generally is anticipating a revival of export business following the conclusion of an agreement with Austria, under negotiation, but even with this, stiff German competition in the Eastern market must be considered.

Steel Production Still Low

The figures on steel production during 1920 are now available. An aggregate of 972,976 tons of steel was produced, of which 163,663 tons (16.82 per cent) was basic Bessemer, 792,794 tons (81.48 per cent) was open hearth and 16,519 tons (1.7 per cent) was electric furnace. Compared with 1919, the total output shows an increase of 186,954 tons or 23.8 per cent, which is principally because of improved fuel supply as well as resumption of operations at Slovakian plants. A study of the figures for former years reveals, however, that the 1920 figures are still behind pre-war and war production, the output of plants in what is now Czecho-Slovakia during 1913 having amounted to 1,237,021 tons, while 1,610,079 tons were produced in 1917 and 1,019,032 tons in 1918.

Trade Agreement with Italy

A trade treaty has been signed between Italy and Czecho-Slovakia valid for one year beginning April 15. Under its terms Czecho-Slovakia, among other commodities, is permitting the import of the following maximum quantities: 1000 automobiles, 300 motorcycles, 1000 pedal bicycles, 15 tons of bicycle accessories, 100 tons of cables and electric wires, 250 tons of electrical material which includes ventilators, motors under 1 h.p., direct and alternating current motors up to 2000 h.p., pumps, fans, etc., and 25 tons of dough-mixing and kneading machinery. Italy in return permits the import of 1000 automobiles and 100 motor plows as well as the export of 10,000 tons of iron ores and 6000 tons of pyrites.

Slackness reported in the coal industry is beginning to react upon certain branches of the machinery manufacture, as is evidenced by the reserved attitude of collieries, coke oven plants, etc., which have always been regarded the best customers. Conditions in the agricultural machinery line also leave much to be desired. Whether the recent reduction of the export levy from ½ per cent to ¼ per cent of the invoice value will act as a stimulus to the export market, remains to be seen. Except for some activity in vehicle and rolling stock manufacture, there is very little improvement.

Increased attention is being devoted to stimulating export business and eight of the leading firms, including the Skoda works, Rustan and Laurin & Clement, recently organized an export association for the promotion of Czecho-Slovakian machinery sales abroad. The total capital represented in the association amounts to 274,000,000 kr. while the number of workmen employed by affiliated firms is about 44,000. Another association being organized will handle the export of railroad ties. A certain percentage of the production is to be placed at the disposal of the domestic railroads at lower prices while surplus output is to be exported. Part of the rolling stock industry is occupied with orders for parlor cars for the Egyptian railroad administration, four coaches having arrived at Antwerp en route to Egypt some time ago.

British Steel Exports Still Small in April —Imports Continue Heavy

British steel exports in April this year, excluding iron ore and including scrap, were 161,508 gross tons as compared with 149,847 tons in March, with 167,158 tons in February and with 233,144 tons in January. The April exports last year were 274,337 tons. The average per month in 1920 was 274,881 tons per month while in 1913 it was 420,757 tons per month. The 1919 rate was 188,519 tons per month. The April outgo is therefore less than even the 1919 monthly average and close to the smallest in the war years. Imports in April were 111,536 tons, which contrast with 196,945 tons in January, with 181,565 tons in February, with 179,610 tons in March, and with 128,685 tons per month in 1920. The 1913 imports were 195,264 tons per month.

Expressed as a table the exports and imports this year and in previous years were as follows in gross tons:

	Exports	Imports
January, 1921	233,114	196,945
February, 1921	167,158	181,565
March, 1921	149,847	179,610
Aver. per mo., first quar., 1921	183,373	186,040
April, 1921	161,508	111,536
Average per month, 1919	188,519	50,801
Average per month, 1920	274,881	128,685
Average per month, 1913	420,757	195,264

The trend of some of the principal exports is shown by the following data in gross tons:

	Average per Month 1913	1920	April, 1920	April, 1921
Pig iron	78,771	38,505	52,095	7,218
Steel rails	41,676	11,213	7,408	25,000
Steel plates	11,162	16,571	12,393	13,949
Galvanized sheets	63,506	34,244	36,206	9,659
Steel bars	20,921	30,322	27,825	10,592
Tin plates	41,208	29,418	32,951	13,667
Black plates	5,679	3,026	2,261	878

The April exports of steel rails exceeded the 1920 monthly rate, all others showing a pronounced decline.

Pig iron imports in April were 33,662 tons as compared with 11,216 tons in April, 1920. The monthly

average imports in 1920 and 1913 were 12,705 tons and 18,059 tons respectively.

Iron ore imports in April were only 123,583 tons as compared with 541,742 tons per month in 1920. In April, 1920, they were 748,418 tons. The total for the first four months was 1,234,261 tons as compared with 2,073,737 tons in the first four months in the year 1920.

Manganese ore imports were only 7694 tons in April against 37,717 tons per month in 1920 and 50,098 tons per month in 1913. The total to May 1 this year was 112,186 tons against 109,482 tons for the same four months last year.

TARIFF LEGISLATION

New Causes for Delay Develop—Duty May Be Placed on Manganese Ore

WASHINGTON, June 7.—Permanent tariff legislation is in a state of confusion. Members of the House Committee on Ways and Means still have differences of opinion as to certain schedules, including those relating to silk, cotton, wool and chemicals. Several items in the metal schedule also remain to be acted upon, including ferromanganese, though it is said this is due to a request of members of the sub-committee having charge of this schedule rather than to any sharp divergence of views. It is claimed that some further consideration is being given these particular items in the metal schedule, yet it also is indicated that the full membership of the committee does have conflicting opinions on them. The recommendation of the Payne-Aldrich rate of $2.50 a ton is said to have been made by the sub-committee on ferromanganese when it presented its schedule, but it remains to be seen whether this may not be increased. There is an absence of clear evidence, however, that an advance will be suggested. Such a move, it is believed, would mean the fixing of a duty on manganese ore, which has been both opposed and defended, with the result that the recommendation of the sub-committee is reported to have been that manganese ore be continued on the free list.

The differences within the committee itself are apparently not so important as are those of the full Republican membership of the House over the Longworth joint resolution giving the Ways and Means Committee discretionary power to make any or all duties in the forthcoming permanent tariff bill effective from the day the latter is reported to the House. The conference of the House Republicans last Wednesday over the resolution developed vigorous opposition to the resolution. Part of the protest was against the entire purpose of the resolution, while some of the opposition was to the form of the resolutin. This takes the character of an argument that the resolution gives too much power to the Committee on Ways and Means by permitting it within itself to determine the rates to be put into effect without first letting Congress pass upon them. It is likely that, in pressing the Longworth resolution further, a compromise will have to be effected, if it is to succeed in passage, which, at present, seems to be doubtful. For not only is there opposition in the House Republican membership, and practically the entire Democratic membership, but the Senate appears to be hostile to such legislation, both as to Republicans and Democrats, though a real test might develop more support of the resolution in the Senate than has been indicated. Not a great deal of support has been given to the claims of opponents of the resolution that it is unconstitutional.

Perplexing Features

It can not be denied that the tariff is proving to be a perplexing problem with some new features of difficulty. The so-called differences cannot be accepted, however, as proof that Republicans as a whole are lukewarm regarding a protective tariff. The great majority favor it and with old-time vigor, though taking into consideration present-day economic conditions, such as the high cost of living, world-wide trade depression and disturbed international exchange, calling for careful procedure. Some are especially urgent in insisting upon passage of the Longworth resolution and say that unless it or some other sort of ad interim legislation is enacted the country will be made the dumping ground for imports despite anti-dumping legislation. They also still are in sympathy with the plan to enact exchange legislation based on American valuation to replace the provision attached to the emergency tariff act.

The disagreements over the tariff legislation leaves as much doubt as ever as to when the permanent bill will be ready for reporting to the House. Dates are set only to pass by without action, and, while suggestions now are made that the measure will be ready by June 15, expressions are heard that the actual date will be nearer July 1. So uncertain are some members of Congress that they have reached the point where they favor the idea of Congress taking a recess for a month or so before anything further is done regarding either tariff or taxation or other important legislation. The program before Congress still is so great that it is apparent it will have a long, difficult grind ahead of it before the work is done, and some members think this session will practically merge into the new one before the program can be completed.

Lake Iron Ore Shipments in May Small

Shipments of iron ore from the Lake Superior region in May were 2,594,027 gross tons or 62.81 per cent less than in May, 1920, when the total was 6,976,085 tons. This is a decrease of 4,382,058 tons for May this year. In May, 1920, there was increase of 5.45 per cent over May, 1919. The comparative shipments by ports for May, 1920, and May, 1921, and for the season were as follows in gross tons:

	May, 1920	May, 1921	To June 1 1920	To June 1 1921
Escanaba	795,673	72,048	795,673	72 048
Marquette	375,036	13,985	375,036	13,985
Ashland	1,013,049	208,390	1,013 049	217,539
Superior	1,983,660	730,708	2,189,246	842,556
Du'uth	1,662,971	1,199,457	1,688.239	1,226,888
Two Harbors	1,145,696	369,439	1,145,696	397 222
Total	6,976,085	2 594,027	7,206,939	2,770,238
Decrease	.....	4,382,058	.....	4,436,701

The decrease to June 1 this year is 61.56 per cent as compared with the same date in 1920, or 4,436,701 tons. A year ago there was a decrease as compared with 1919 of 820,641 tons. The Duluth and Superior percentage of the total to June 1, this year, was 74.70 per cent against 53.80 per cent last year. The Escanaba proportion of the total was only 2.61 per cent as compared with 11.04 per cent last year. Duluth's percentage of the total this year was 44.29 as compared with 23.42 per cent to June 1, last year.

To provide against collisions between locomotives and either vehicles or pedestrians, the Illinois Steel Co. has installed a safety reflector device at a blind corner in its South Chicago works, according to the *National Safety News* for June. Drivers and pedestrians going north and engineers proceeding east on the narrow gage tracks were previously unable to see each other until face to face, accidents being narrowly averted. Since the mirror was installed, approaching parties can see each other at 60 to 70 ft. apart. In addition, the square corner of the open-hearth building has been rounded off.

The Bureau of Supplies and Accounts, Navy Department, is asking for bids on 90 gross tons of ferromanganese, 75,000 pounds of nickel in shot form, 446 gross tons of foundry pig iron, 90 gross tons of lump Bessemer ore and 23 tons of 50 per cent ferrosilicon, all for delivery at the Navy Yard, Washington, as may be ordered during the period ending June 30, 1922. The tonnages asked for are estimates only and the Government will not be obligated to order any specific quantity of the material contracted for.

Power and Portable Saws

Two new machines have been added to the line of saws manufactured by the W. Robertson Machine & Foundry Co., Buffalo, N. Y. They are the No. 2, 1921 model Economy power saw with 6 x 6 in. capacity and the Economy portable machine, illustrated in the accompanying illustrations.

The No. 2 saw is a draw cut machine and is equipped with an oil lift pump for relieving the teeth of the blade of drag on the idle or return stroke. This feature consists of a two cylinder pump submerged in oil, one plunger of the pump being timed with the crank shaft and the other plunger connected to the frame. At the end of the cutting stroke, the plunger connected to the crank shaft is on the down stroke, which forces the

Power Saw Equipped with Oil Lift. The insert shows a general utility portable saw, hand or power operated

oil under the plunger connected with the frame, thus raising the frame from the work. At the beginning of the cutting stroke the pump timed with the crank shaft has just passed a port allowing the oil to escape, thus permitting the frame to lower while on the cutting stroke. This feature is employed in a larger machine described in THE IRON AGE of Jan. 25, 1917.

With the oil lift blades cannot be broken by the frame falling on the work and it is claimed that upward of 200 per cent more service is obtained from the blade. A swivel vise is provided for cutting angles up to 45 deg. The machine is driven by a friction clutch and stops automatically when the cut is completed.

The Economy portable saw is hand or power driven and is designed as a general utility machine in the shop or elsewhere when the two legs are applied. Used in steel yards or warehouses the current is taken from lamp sockets and where current is not available a lever is provided for hand operation. The machine has a capacity of 8 in. using 17 in. blades. The motor is mounted on a bracket supported from the bed and is coupled to a shaft on which there is a steel worm running in oil. This worm drives a gear on which there is a crank wheel which in turn is connected by a rod to the frame. The feed is by gravity.

The Youngstown Sheet & Tube Co. advises that W. E. Manning, vice-president and general sales manager of that company, was incorrectly quoted in a report of the annual meeting of the National Pipe and Supplies Association in the May 26 issue of THE IRON AGE. Remarks attributed to Mr. Manning were to the effect that his company's orders for welded pipe had increased since early in the year. Mr. Manning states that he did not discuss the plant operations of his company in the course of his remarks at that meeting.

Steel Workers Decrease

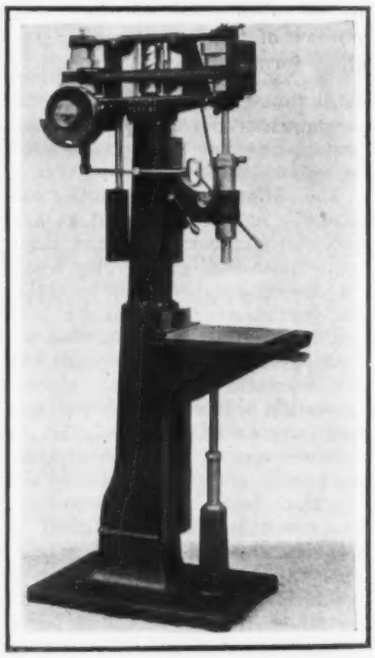
WASHINGTON, June 7.—Employment in the iron and steel industry in May showed a decrease of 8781 workers below the number in April, according to the United States Employment Service. Based on actual payroll returns from 428 of the larger firms in 14 lines of industry in 65 principal industrial centers, each nominally employing 500 or more, a total of 1,600,000, the net decrease was 7211 workers, or 0.5 per cent. The total decreases in seven industries was 27,383, of which 21.9 per cent represented the iron and steel industry, and the increase in employment in seven industries was 20,172.

Among the latter industries were railroad repair shops, leather, automobiles and textiles. The net decrease in employment since January 31, has been 54,596, or 3.3 per cent.

Some of the iron and steel centers showing decreases in employment in May, and the number affected, follow: Buffalo, 1920; Cincinnati, 1017; Johnstown, Pa., 714; Birmingham, Ala., 1222; Chicago, 4892. A slight increase in employment was shown in other steel centers, as in Youngstown, where the increase was reported to be 265; Cleveland, 586, and Pittsburgh, 511 men.

New Line of Drilling Machines

A line of drilling machines has been developed by the Cincinnati Hy-Speed Machine Co., Cincinnati, and are being marketed under the name of Hy-Speed. The accompanying illustration shows the general construction.



The Table Elevating Mechanism Is Arranged to Allow Taps to Pass Through the Center of the Table

Among the features of the line are the single pulley direct overhead drive and the dry-plate clutch operating in connection with an external clamping adjustable air-cooled brake. A single handle directly in front of the operator is provided for convenient starting and stopping. The table elevating mechanism is arranged to allow taps, etc., to pass through the center of the table, a feature which with the use of a quick release chuck permits tapping without reversal at high spindle speeds. Spindle speeds are controlled by a handle outside of the column. Automatic power feed and automatic tapping attachment can be arranged on any spindle.

Unit construction is embodied in the machine, the entire clutch, brake and initial driving gear being a separate unit that is set into the top bracket. For accessibility the counter weight for the spindle is hung on the outside of the machine. A narrow face idler pulley is carried directly on the belt shifters and moving intermittently with the shifters helps lead the cone belt from one step to another. Aluminum pulleys are used throughout.

The pump and tank is a separate unit, attached to the base of the machine. S. K. F. ball bearings are used.

The line includes floor and bench type machines; single speed purpose, belted motor drive, automatic power feed and automatic tapper.

United States Steel Corporation's Answer

Makes Specific Denial of Many Allegations of Complaint in Pittsburgh Plus Case and Plants Itself Upon Decision in Dissolution Case

THE United States Steel Corporation last Saturday filed at Washington its answer in the so-called Pittsburgh plus case of the Federal Trade Commission against the United States Steel Corporation, American Bridge Co., American Sheet & Tin Plate Co., Carnegie Steel Co., National Tube Co., American Steel & Wire Co., Illinois Steel Co., Minnesota Steel Co., Clairton Steel Co., Union Steel Co., Lorain Steel Co. and Tennessee Coal, Iron & Railroad Co. The answer of the corporation consists of a denial of many of the allegations of the complaint and rests to a large extent upon the decision of the Supreme Court of the United States in the dissolution case, findings of that court being carefully stated in the thirteenth paragraph of the answer.

Paragraph 5 of the complaint, which is denied as to every allegation, inference and argument, charged that for more than seven years the corporation had issued quotations of prices covering the products of its respondent subsidiaries, which schedules were accepted by the subsidiaries and their competitors and that this practice of fixing uniform prices succeeded the custom which formerly prevailed whereby manufacturers openly met and agreed upon prices.

Paragraph 8 of the complaint, likewise denied, consisted of an attack upon the Birmingham price as unfair and unlawful.

Paragraph 10 set forth in detail the alleged results of the Pittsburgh basing plan, charging that it gave Pittsburgh steel manufacturers unfair advantages in extending their trade to the detriment of others, and enabled steel manufacturers outside of Pittsburgh to increase their profits unduly.

Probable Course of Procedure

The Washington representative of THE IRON AGE sends the following statement as to the present status of the case:

"Study is being made by the Federal Trade Commission of the reply of the United States Steel Corporation to the commission's complaint in the so-called Pittsburgh plus case with a view to determining the procedure that will be followed. Any points of agreement by the commission and Steel Corporation will be eliminated as topics for discussion at the approaching hearing, while the points of dispute, together with new angles that the commission may consider the Steel Corporation has developed will be made the objects of attack and defense. In the absence of completion of its study the commission is unable to state the precise character of its program, such as the steel centers where hearings will be held. It is believed, however, that they will largely revolve around Pittsburgh, Chicago, Duluth, Minn., and Birmingham, Ala.

"The formal conduct of the case, however, is outlined automatically by the act creating the commission. It will, upon scrutiny of the reply, negotiate with the Steel Corporation for the purpose of setting a date when the hearings shall be begun. An examiner and an attorney will be selected by commission to have charge of the proceedings for it, and it is believed that Attorney Stienhaur, who drew the complaint, will conduct the hearings for the commission. The name of the examiner in charge is said not to have been decided.

"At the conclusion of the hearings, which promise to be of a protracted character, each side will file briefs, summarizing the evidence adduced, and making contentions each respective side considers to be of the most importance. This will be followed by formal arguments before the entire commission, which will take place in Washington. The decision then will come next and should it be in the nature of a "cease and desist" order, appeal undoubtedly will be made to the United States Supreme Court. Should the commission find that the use of the so-called Pittsburgh plus plan in selling steel does not constitute an unfair method of competition, the case would come to an end and the practice left undisturbed.

"So far none of the independent steel companies has asked to intervene in the case. It will remain with the discretion of the commission, if they make such request, to decide whether it shall be granted or denied."

Text of the Answer

The answer of the Steel Corporation and subsidiaries follows:

UNITED STATES OF AMERICA.
BEFORE THE FEDERAL TRADE COMMISSION.

Federal Trade Commission vs. United States Steel Corporation, American Bridge Co., American Sheet & Tin Plate Co., Carnegie Steel Co., National Tube Co., American Steel & Wire Co., Illinois Steel Co., Minnesota Steel Co., Clairton Steel Co., Union Steel Co., The Lorain Steel Co., and the Tennessee Coal, Iron & Railroad Co.

The above named respondents come now and answer the complaint herein as follows:

I. Respondents admit that United States Steel Corporation is a corporation organized and existing under and by virtue of the laws of the State of New Jersey, and that it has offices in the City of New York, State of New York. They refer to the certificate of incorporation of said United States Steel Corporation annexed hereto and marked "Exhibit A" for a statement of the purposes for which said corporation was organized. They admit that said United States Steel Corporation acts as a holding corporation of substantially all of the capital stock of the corporations named in paragraph one of the complaint as subsidiaries thereto, and they are hereinafter referred to as such. They admit that said subsidiaries are engaged in the manufacture and sale of iron and steel and the products thereof as in said complaint stated, except that they say that the plant of the Clairton Steel Co. is leased to and operated by the Carnegie Steel Co., and the plants of the Union Steel Co. are leased to and operated in part by the Carnegie Steel Co., in part by American Steel & Wire Co. and in part by the American Sheet & Tin Plate Co.

II. Respondents aver that United States Steel Corporation sustains no relation to any of said subsidiaries except as a stockholder as aforesaid, although it does from time to time make recommendations to said subsidiaries with respect to the conduct of their several business and exercises such control over them as is incident to such stock ownership. Except as herein admitted, respondents deny the allegations contained in paragraph two of the complaint.

III. Respondents admit the allegations contained in paragraph three of the complaint with respect to said subsidiaries except the Clairton Steel Co. and the Union Steel Co., but deny the same with respect to the United States Steel Corporation and said two subsidiaries.

Ore and Limestone Deposits

IV. Respondents deny that United States Steel Corporation through its said subsidiaries or otherwise owns

or controls over 75 per cent of the total iron ore deposits in the Lake Superior district; deny that it or its subsidiaries own or control the greater part of the iron ore deposit in the State of Alabama; deny that it and its subsidiaries own or control the ultimate iron ore supply of the United States; deny that it and its subsidiaries own or control the major number of the railroad and lake transportation systems which carry the iron ore from the mines to the manufacturing plants of said subsidiaries and their competitors; and deny that, except to a limited extent, it or its subsidiaries own or control the coal mines which furnish the necessary coal employed in the manufacturing processes of said subsidiaries. They admit that said subsidiaries control sufficient limestone quarries to furnish the limestone employed in their manufacturing processes, as do substantially all other steel manufacturers, but say that limestone is found in such vast quantities in all parts of the country as to be readily available to anyone. Respondents say that United States Steel Corporation and its subsidiaries do not own or control over 30 per cent of the total iron ore deposits in either the Lake Superior district or in the State of Alabama; and that altogether they control only two ore carrying railroads in the Lake Superior district out of nine such railroads operating therein, and only one out of seven such railroads operating between the lower lake ports and the manufacturing plants of said subsidiaries and their competitors, and that said railroads so controlled by respondents are obligated by law and do in fact serve all interests alike and without discrimination and at rates fixed by the Interstate Commerce Commission.

Transportation and Other Activities

Respondents further say that the lake transportation system controlled by them or some of them and referred to in said complaint is employed solely in transporting ore, coal and limestone for the subsidiaries of the United States Steel Corporation and does not transport said materials or any of them for any other interests, the ore, coal and limestone of other manufacturers being transported to and from the Lake Superior district by various other transportation systems. Respondents also say that they do not, nor do any of them, own or control coal mines with a sufficient output to furnish all the coal necessary in the manufacturing processes of said subsidiaries; on the contrary, said subsidiaries are compelled in normal times to purchase a substantial quantity of their coal requirements from outside sources. Respondents admit that United States Steel Corporation has capital stock outstanding of the par value of $868,583,600, and of a book value exceeding one and one-half billion dollars. They also admit that the gross assets of said United States Steel Corporation and of all of its subsidiary companies aggregate over two billion dollars. They say that said United States Steel Corporation does not itself manufacture or sell any steel products, but admit that the total annual business of its subsidiaries, including intercompany business, has at times amounted to approximately one and one-half billion dollars. Respondents admit that said subsidiaries manufacture approximately 47 per cent of crude steel in the form of ingots, but say that said subsidiaries sell practically none of the crude steel manufactured by them in that form. They admit that at times said subsidiaries manufacture approximately 45 per cent of the semi-finished rolled steel in the form of billets, blooms, slabs, sheet and tin plate bars, and furnish rolled steel in the form of rails, plates, sheets, structural shapes, bars, wire rods, skelp, hoops, bands and cotton ties, manufactured in this country, some of which is sold by them in interstate commerce. They say, however, that the percentage of these products manufactured, as well as the percentage sold, by said subsidiaries varies from time to time and is dependent upon business conditions. They deny that said subsidiaries manufacture or sell approximately 60 per cent of other steel products, such as wire and the products made therefrom, pipes and tubular goods and tin plate, and allege that the total capacity of the subsidiaries to produce these materials is much less than 60 per cent, and that the percentage of such products manufactured and sold by them varies from time to time, depending upon business conditions.

Some Buy Steel

Respondents admit that some of the competitors of said subsidiaries do not manufacture steel but purchase semi-finished steel from the manufacturers thereof, and make and fabricate therefrom various kinds of steel products, some of which are made and fabricated by said subsidiaries. They say, however, that numerous of said competitors do in fact manufacture their own steel and finish the same into various products, and that there is an open and unrestricted market for the supply of those who do not so manufacture their requirements of steel. Respondents deny that United States Steel Corporation owns, controls or utilizes, directly or indirectly, 145 plants for the manufacture of steel products. They say that the total number of plants of said subsidiaries engaged in the manufacture of both steel and steel products and the fabrication of the latter does not exceed 125, and that no plants or such subsidiaries are located in the States of Maryland, Kentucky, Kansas, and Washington.

V. Respondents deny each and every allegation, inference and argument contained in paragraph five of the complaint.

Practice as To Quoting

VI. Respondents admit that, with certain exceptions mentioned in the complaint, said subsidiaries usually quote their products on what is commonly called the Pittsburgh basis, which represents their prices for such products in Pittsburgh plus the freight to the point of sale and delivery. This is the practice among steel manufacturers generally. Respondents deny that said price is arbitrarily fixed or arrived at, and say that it varies from time to time, and among the different manufacturers, and represents the judgment of each manufacturer as to the market conditions affecting or likely to affect his particular products. They further say that said quoted prices are seldom adhered to strictly, either by said subsidiaries or their competitors; that steel is sold by all of them, subsidiaries and competitors, in the different consuming localities, at the market prices prevailing therein as determined by the law of supply and demand and the competition among the manufacturers, which competition now is and for a long time last past has been vigorous and unrestrained and extends to prices, quality and service, and to every article of production in every locality in which the same is sold. They also say that said market prices are frequently materially lower than the prevailing Pittsburgh price plus the freight rate from Pittsburgh to point of destination, particularly when the supply from the territory outside of Pittsburgh equals or exceeds the demand in such territory.

Convenience of Customers

The practice of quoting a base price is largely for the convenience of customers and is not confined to the steel industry nor to this country but exists throughout the world, and is followed in many, if not most, of the more important lines of production and sale. In the steel industry it has obtained from the beginning and became a settled custom long before the United States Steel Corporation was formed. Pittsburgh was made the basing point in the early days because at that time nearly all steel was manufactured in the Pittsburgh district. It has remained the basing point simply because, notwithstanding the construction of steel manufacturing plants in other localities, the country outside of Pittsburgh is still dependent upon the Pittsburgh market for the major part of its requirements of steel excepting rails.

Respondents deny that said subsidiaries, other than the Tennessee Coal, Iron & Railroad Co., sell their products of steel in Birmingham, Alabama, or any other basis than elsewhere, or that they sell in Birmingham at the Pittsburgh price with the addition thereto of $5 per ton. They admit, however, that the Tennessee company does sell certain of its products in Birmingham on the basis stated in said complaint, and say that the price so arrived at represents a temporary concession

made by the Tennessee company to the Birmingham manufacturers in order to enable the latter to develop certain industries which would be of great benefit to the South, and would furnish an additional market for the products of said company.

Costs at Various Points

VII. Respondents deny that steel is manufactured in either Chicago, Ill., or Birmingham, Ala., more cheaply than in Pittsburgh, but admit that the price charged for steel by the said subsidiaries in each Chicago and Birmingham exceeds the Pittsburgh price by more than the difference in the cost of production in the respective localities. They deny, however, that the price charged in Chicago, Birmingham and the other localities mentioned in the complaint is either unfair or unlawful, and aver that with the exception mentioned at the end of paragraph VI it is the market price prevailing in each locality regulated by the law of supply and demand and the free play of competition in the locality affected, and varies from time to time in accordance with the market conditions obtaining therein.

Respondents deny that purchasers of rolled steel outside of Pittsburgh are unable to secure such steel from any steel manufacturer in the United States at any price other than the Pittsburgh plus price, and repeat the averments contained in paragraph VI above in that regard.

VIII. Respondents deny each and every allegation, inference and argument contained in paragraph eight of the complaint.

IX. Respondents admit that the different prices charged by said subsidiaries for their various products as between different localities and communities are not made on account of differences in the grade or quality of such products and that such differences in price are not based on differences in the cost of selling such products or on differences in the cost of transportation. They aver, however, that such different prices are made in good faith on account of the quantities furnished or to meet competition in the different localities and communities, and represent the market prices prevailing therein from time to time. They deny that such differences constitute discrimination within the meaning of Section 2 of the Clayton act or any other law of the United States.

X. Respondents deny that they or any of them utilize Pittsburgh plus price to accomplish or that they do accomplish any of the purposes stated in paragraph 10 of the complaint, and they deny each and every allegation of fact, inference and argument contained in the various sub-divisions of said paragraph.

No Unfair Advantage

XI. Respondents deny that the practice of said subsidiaries under the Pittsburgh base plan as described in paragraph VI. above now has, or ever has had, the effects stated in paragraph 11 of the complaint, or any of them. They deny that such practice gives to the Pittsburgh fabricators, including said subsidiaries, an unfair or undue advantage over fabricators in other parts of the United States. They say that the fabricators located outside of the Pittsburgh district are and always have been free to locate wherever it appeared to them that their business could be conducted most profitably; that everyone of them, whether situated at Chicago, Duluth, Birmingham, Fort Dodge or elsewhere, chose his location and erected his plant after the Pittsburgh basing practice had become an established custom in the steel industry, and that while, by reason of difference in freight rates, rolled steel delivered at their plants generally costs them more than it costs the Pittsburgh fabricators, they have other countervailing advantages on account of which they have prospered more and increased in number much faster than the Pittsburgh fabricators.

Respondents deny that the Pittsburgh basing practice tends to lessen competition with or create a monopoly for the Pittsburgh fabricators including said subsidiaries. They say that on the contrary its tendency is to stabilize the fabricating industry, increase competition and distribution and prevent monopoly therein and in the steel trade generally, and that such has been its effect notwithstanding the increase in railroad freight rates referred to in said complaint.

Respondents deny that the possession of fabricating plants as well as steel plants in Pittsburgh or elsewhere gives to said subsidiaries an unfair, undue or illegal advantage over their competitors anywhere, either by reason of said Pittsburgh basing practice or otherwise, or that it tends to lessen competition with or create a monopoly for said subsidiaries. They also deny that said Pittsburgh basing practice provides a method whereby the steel manufacturers of the United States maintain uniform prices among themselves. Respondents say that as matter of fact uniform prices are not and for a long time have not been maintained among the steel manufacturers; that on the contrary steel prices do now and for a long time past have varied widely between all manufacturers in all parts of the United States and in substantially every line of production. Such prices are fixed by the several manufacturers independently and there is not now and for many years has not been any agreement or understanding, expressed or implied, between such manufacturers with respect thereto.

Does Not Violate Clayton Act

XII. Respondents deny that in following the Pittsburgh basing practice or otherwise said subsidiaries have been or are using an unfair method of competition in commerce within the intent and meaning of Section 5 of the Federal Trade Commission act or have been or are discriminating in price between the different purchasers of their products in violation of Section 2 of the Clayton act.

The Dissolution Suit

XIII. Respondents further aver that on October 26, 1911, the United States of America filed a petition in the United States District Court for the District of New Jersey against respondents other than Minnesota Steel Co., Illinois Steel Co. and The Lorain Steel Co., but making the Federal Steel Co. a defendant as the owner of all the capital stock of said three companies. Said petition alleged that United States Steel Corporation and said subsidiaries and the Federal Steel Co. constituted a combination in restraint of trade under the first section of the Federal anti-trust act of 1890 and a monopoly under the second section of said act, and prayed for an injunction restraining the further maintenance of said combination and monopoly and a decree dissolving the same and the said corporations respectively. The said defendants filed an answer denying the allegations of said petition, whereupon a large amount of testimony was taken by the respective parties, after which the cause was brought to a hearing before said court on such petition, answer and proofs. After due deliberation, the court on Sept. 15, 1916, made a decree dismissing said petition on the merits. The United States took an appeal from said decree of dismissal to the Supreme Court of the United States, which appeal was duly argued and resulted in the affirmance of said decree on the first day of March, 1920. The record of said proceedings in the District Court of the United States for the District of New Jersey and in the Supreme Court of the United States are now on file in the offices of the clerks of said respective courts and respondents are ready to produce and prove the same when and where this honorable commission may direct, and pray for leave so to do.

Respondents aver that in said cause, as appears by the record thereof, the following facts were found, established and adjudged as between the United States of America and these respondents, that is to say:

Findings of Supreme Court

(*a*) *That respondents did not have a monopoly of the iron ore deposits, either in the Lake Superior District or in the State of Alabama or in the United States at large.*

(*b*) *That respondents did not own or control the ultimate iron ore supply of the United States.*

(*c*) *That respondents did not own or control a monopoly of the coal suitable for steel making purposes in the United States.*

(d) That respondents did not possess a monopoly of the railroad and lake transportation systems which carry ore from the mines to the manufacturing plants of said subsidiaries or competitors or, through such systems as it did control, possess the power to monopolize the raw material from which steel is manufactured.

(e) That respondents did not own or control a sufficient amount of any branch of steel manufacturing to constitute a monopoly thereof, or so large a percentage as to constitute a violation of law.

(f) That respondents did not possess the power to fix or control, and did not in fact fix or control, the prices of steel or the products thereof.

(g) That respondents did not possess the power to either control or destroy their competitors.

(h) That respondents did not control the prices of steel products nor fix the prices charged by their competitors.

(i) That respondents did not either singly or in combination constitute a monopoly or possess the power to monopolize the steel trade in the United States or elsewhere.

(j) That competition in the manufacture and sale of steel and the products thereof in the United States was free and unrestricted by any agreement, combination or understanding between the manufacturers or sellers thereof.

Respondents aver that there has been no material change in the constitution, holdings, powers or practices, or in the relative capacity or output of the respondents or any of them since the said adjucation and the said dismissal of the Government's petition; that the matters of fact so as aforesaid found, established and adjudged in said cause were each and all of them within the issues joined and tried therein, and respondents plead the said findings and adjudication in bar of the allegations contained in paragraphs 4, 5, 7, 8, 9, 10, 11 and 12 of said complaint to the contrary thereof.

XIV. Respondents further submit that an order of the kind or effect suggested in said complaint would be unwarranted by any law of the United States; that such an order would constitute an interference with respondents' liberty of contract and would amount to the taking of respondents' property without due process of law, contrary to the Fifth Amendment to the Constitution of the United States.

WHEREFORE, respondents pray that said complaint may be dismissed.

WILLIAM W. CORLETT,
Attorney for respondents.

RICHARD V. LINDABURY,
CORDENIO A. SEVERANCE,
of counsel.

Requested to Have Hearing in Milwaukee

MILWAUKEE, June 6.—The construction industries committee of the Milwaukee Association of Commerce has requested the Federal Trade Commission to hold a hearing in Milwaukee in its proposed investigation of the Pittsburgh plus question. Resolutions adopted by the committee say in part: "It has been represented to this committee by fabricators of structural steel that from $6 to $8 a ton is added to the cost of their product by the rolling mills through the operation of the so-called Pittsburgh plus method of pricing steel, and that they would be able to reduce their bids immediately to that extent if this practice were abolished." The resolutions were adopted as a part of the function of this committee to investigate the cost of building and to take such steps as it sees fit to bring about a revival of the building industry.

Pittsburgh Basing Point to Be Discussed

H. G. Pickering, counsel for the Western Association of Rolled Steel Consumers and W. L. Chandler, president the National Association of Purchasing Agents, will speak on "Pittsburgh Plus" at an open meeting of the Chicago Purchasing Agents' Association to be held at Hotel Sherman, Chicago, on June 9. The National Association of Purchasing Agents is an organization of over 4000 members. The Chicago Purchasing Agents' Association was the first to oppose the Pittsburgh basing point on rolled steel prices, having its first meeting devoted to the subject Feb. 19, 1919. The St. Louis and Milwaukee associations held similar meetings shortly thereafter and subsequently the national association took a definite stand in opposition to the basing practice and presented the following resolution before the Federal Trade Commission on Nov. 16, 1920:

"Resolved, That in our opinion all lines of trade could be stabilized by establishing a standard of cost finding plus a legitimate profit to sustain their industry and base the selling price at point of production according to supply and demand."

Evils of Picketing

WASHINGTON, June 7.—That picketing is wrong for the employee as well as for the employer was the statement of Judge Dan Thew Wright, former judge of the Supreme Court of the District of Columbia, at a hearing last week before a special sub-committee of the House District committee in connection with a bill introduced by Representative Blanton of Texas to prevent picketing. The measure is not believed to stand much chance of being passed by Congress.

Judge Wright declared that picketing is "nothing else but concerted coercion." He said that the public is against it, and that it is bad for the unions, because in order to win they must have support. In characterizing picketing as coercion, he stated that when employees have a grievance against any particular concern, they have a right to publish it in any way they see fit, but when this publication assumes the character of coercion, it is wrong.

Judge Wright said that the only time when peaceful picketing has been upheld was when prosecution has been brought under municipal ordinance, such as disturbing the peace, blocking the sidewalk, etc., and not with reference to an anti-picketing law. The court upholds the right of the employer to exclude union men in the selection of employees, if he so desires, it was declared.

"There is no question," Judge Wright added, "of the right of the men to be unionized. The employer has a right to exercise his preference in the selection of employees in the conduct of his own business. If the public recognizes the right of men to organize a union, it must recognize this principle."

Failed to Agree

The conference at Atlantic City between the Western Bar Iron Association and the Amalgamated Association of Iron, Steel and Tin Workers adjourned last Saturday without agreement on the new wage contract. The present agreement expires June 30. In the meantime, further efforts will be made to negotiate a new contract covering the bar iron scale. Employers asked the elimination of a number of extras and the 15 per cent advance on 1.50c. iron and higher, which was granted last year.

Conferees are considering the sheet and tin mill wage scales this week, representatives of the Amalgamated meeting with manufacturers who are members of the Western Sheet and Tin Plate Manufacturers' Association.

The Massachusetts State Employment office reports an increase in orders for employees of 3 per cent in May, as against April, but a decrease of 46 per cent as compared with May, 1920. People wanted by employers increased 14 per cent over April, and decreased 50 per cent as contrasted with May, 1920. Positions filled increased 13 per cent and decreased 36 per cent respectively. The principal demand in the men's skilled department was for painters and easily satisfied. There is an occasional call for men in the building lines, with the supply far exceeding the demand.

Modern Steel Works Power Plants*

Centralization and Economy of Units Stressed —Attention to Details Urged as Source of Savings—Waste Heat Boilers—Preheated Air

BY WALTER N. FLANAGAN

MOST of the new plants show to some extent investment efficiency, that is, greater capacity is being obtained from a given amount of equipment; practically all show labor efficiency, in that each new plant built produces more boiler horse power or more kilowatt hours per man than older plants. It is now realized that the greatest fuel saving with present equipment can be obtained in the boiler room, and that more care is needed to maintain that efficiency than anywhere else in the power plant. Efficiency of product is obtained in various ways, one of which is superheating the steam, thus rendering a given amount of heat able to produce more work.

Investment, fuel and labor efficiency are all increased by the use of large boiler units, as less space is required for a given capacity; the radiation loss is lower, since the wall exposed surface is less per boiler hp. with modern stokers or other fuel burners one man can handle one or more large units with almost the same facility as the same number of smaller units; and control apparatus, instruments, and attention can be applied to a large boiler at a much lower cost per boiler hp. than to a small one, and these pay big dividends on a small investment.

Importance of Boiler Settings

The design of the boiler settings has become the subject of as much study as the open-hearth furnace. This is due to the number of factors which must be taken care of in the case of a large boiler to be operated at high ratings. The setting of the boiler can limit its capacity and economy by limiting the flame temperature that can be maintained in the combustion chamber. This means that excess air is used merely to keep the brickwork cool; for the same reason, the total heat that can be generated in the combustion chamber is limited, and therefore the capacity of the boiler. Unless expansion and contraction are cared for, large cracks open up every time the boiler is cooled off, and even during operation, on account of the great difference in temperature between the inside and outside wall surfaces. The walls bulge inwardly and eventually fall in. With forced draft stokers, the jet action of the flame cuts grooves or niches in the walls and the spouting or piled-up ash adheres to the side walls until it interferes with the movement or distribution of the fuel bed, causing excess air and unburned fuel loss.

The following table shows losses resulting from air leakage in actual operation in one modern gas-filled boiler plant under test conditions, most of the excess air being due to infiltration.

Effect of Excess Air in Blast Furnace Gas Fired Boilers, Showing Percentage Loss in Boiler Efficiency for Various Percentages of Excess Air

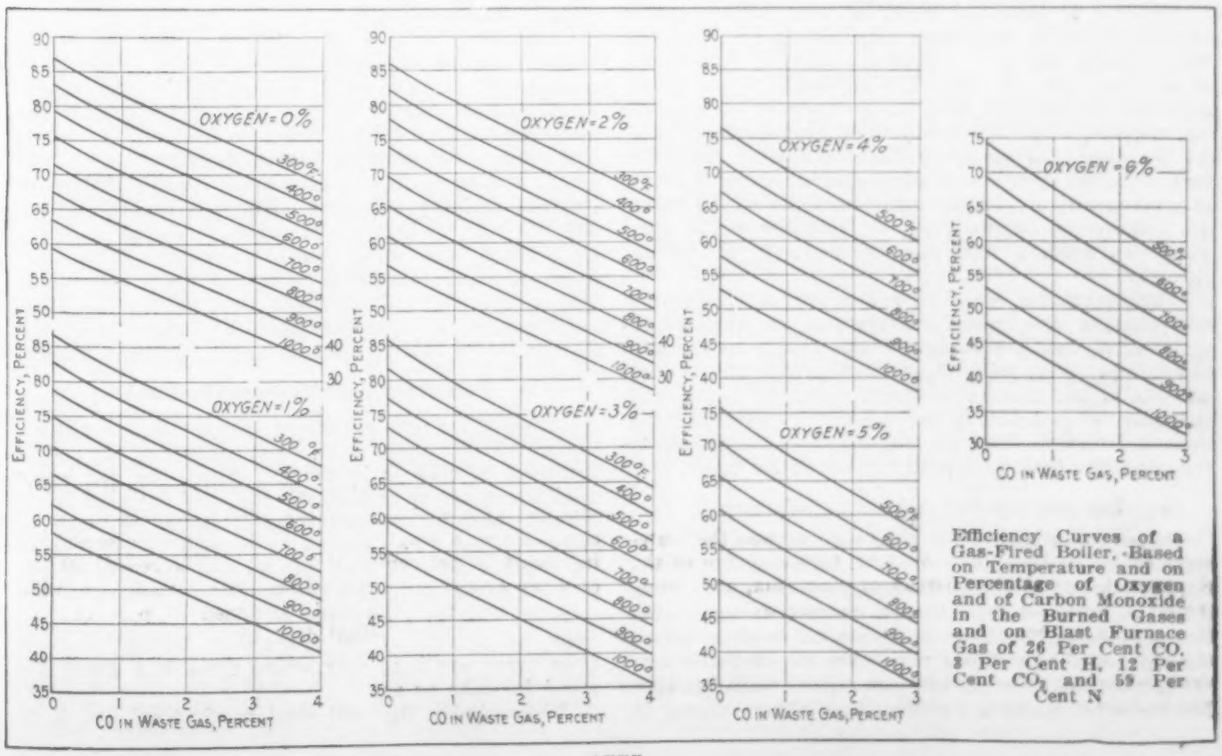
Stack Temp.	Excess Air 25%	50%	75%	100%	125%	150%	175%
500° F.	1.50	3.00	4.52	6.03	7.53	9.04	10.50
550° F.	1.69	3.39	5.08	6.78	8.47	10.14	11.84
600° F.	1.88	3.77	5.65	7.53	9.40	11.30	13.18
650° F.	2.03	4.07	6.10	8.13	10.20	12.20	14.25
700° F.	2.24	4.48	6.72	8.98	11.20	13.45	15.70
750° F.	2.41	4.82	7.22	9.65	12.05	14.50	16.86

Ten per cent difference in efficiency in a 1300-hp. boiler amounts to $15,000 or more difference in fuel cost per year, while a complete steel casing could be installed for about $5,400. The latter figures are based upon ¼-in. plate, riveted and calked, and covering not only the four sides but also the top of the boiler. This would last as long as the boiler and require practically no repairs. A cheaper casing, which would save the above losses, could be installed for half that amount, but it would need considerably more attention.

Waste Heat Boilers

The fact that enormous quantities of heat are thrown away in steel works is clearly recognized. The only question is, does it pay to install means for saving this heat; does the expense of installation and of the

*From a paper presented at the regular spring meeting of the American Iron and Steel Institute in New York, May 27. The author is steam engineer, Ohio Works, Carnegie Steel Co., Youngstown, Ohio.



Efficiency Curves of a Gas-Fired Boiler, Based on Temperature and on Percentage of Oxygen and of Carbon Monoxide in the Burned Gases and on Blast Furnace Gas of 26 Per Cent CO, 3 Per Cent H, 12 Per Cent CO_2 and 59 Per Cent N

operating costs more than overbalance the saving? The fuel to melt and heat steel has in many cases been better utilized by the installation of waste heat boilers, since that is at present the most logical method of preventing this waste.

Waste heat boilers early acquired a bad reputation in many plants, which upon analysis seems due, in addition to improper selection of equipment, to poor installations, i.e., cramped, dark and inaccessible locations, too light or too small fans, air leakage and poor auxiliary equipment.

Some of the more modern installations have been very successful on account of the following:

Proper location for room, access and repairs; preferably grouping to insure attendance.

Proper selection of boiler and setting with a view to obtaining an air-tight setting.

Use of steel jackets, or the coating of settings with plastic covering. On account of high draft in waste heat boilers, namely, boiler draft loss plus furnace draft, the amount of air leakage is far greater than on separately fired boilers, unless settings are tight.

Selection of rugged fans and drives of ample capacity. Fans can now be obtained that will not require inspection or overhauling any oftener than the source of waste heat.

Installation of special boilers, designed particularly for waste heat service.

Installation of reliable accessories, such as feed water regulators in duplicate, thus reducing attendance and danger to the minimum.

Attention to and means for cleaning.

In most plants where the waste heat is not utilized, the boiler power has to be developed by burning coal. In the modern coal-fired boiler plant the cost of the boilers and settings amounts to only 20 per cent of the total plant cost. Waste heat boilers require no expensive buildings with coal bunkers, no coal and ash handling systems, including the requisite space, and do not require wide spaces between boilers or between boilers and walls for operating. They also require no stokers, ash pits, or forced draft fans. Therefore, even if a coal-fired plant can be operated at an average rating of 200 or 250 per cent and waste heat boilers can average only 70 per cent rating, it still pays from purely an investment standpoint to install waste heat boilers, on account of the saving in auxiliary equipment and buildings, even though more heating surface has to be installed.

Heaters to Preheat the Air

The use of preheated air is not new, neither is the idea of its use in connection with boilers, but until recently it was very little considered, probably on account of the low price of coal. The air heater for a boiler must not be confused with the recuperator on a heating furnace, where extremely high temperatures make its life short and require a fairly expensive construction, although even here it pays good dividends if properly taken care of. In connection with boilers the tubes are required to handle gases at from 500 to 750 deg. Fahr., as against 1300 deg. or more in a heating furnace.

The advantages of the air heater over an economizer are—cheaper and lighter construction, no pressure to resist, small building space, freedom from soot or dust, and safety. With fairly clean blast furnace gas no dust adheres to the tubes, if properly designed, i.e., if gas velocities of over 300 ft. per minute are used and the tubes are vertical. One air heater has been in operation for two years with no deposit of dust on the tubes.

Gas Burners Not Always Satisfactory

Increasing attention is being paid to burners. The ordinary burner requires constant adjusting to proportion the air supply to the varying gas pressures. Even if this is watched closely, such burners do not attain thorough enough mixing to insure combustion before the gases strike the tubes, unless the combustion chamber is abnormally large, with consequent radiation loss. The unburned gases are chilled, thus either burning in the last pass, causing high stack temperature, or causing high CO in the stack gases, with accompanying loss, or both.

Recent burner development is along either of two lines: first, with an aspirating type of burner which uses the gas velocity to draw in the correct amount of air for combustion at all ratings; or secondly, an air fan combined with an automatic regulator to supply air to the burner independently of draft, and in correct proportion to the gas flow. In both cases the air and gas ports are subdivided, giving alternate thin layers of air and gas, and attention is given to securing proper gas velocities for thorough mixing. The second type of burner is fairly complicated and expensive where there are numerous small boilers, but is well worth the expense for large units. The aspirating burner is well adapted to small units, as it can be installed for very little more than a common "gas feeder," requires no expert attention, and has no maintenance costs.

For example, a 300-hp. boiler at about 120 per cent rating equipped with goose neck burners, while running with 6 per cent oxygen showed 2 per cent CO in the stack, and a stack temperature of over 800 deg. Fahr., or a boiler efficiency of approximately 46 per cent. Equipped with aspirating burners, the same boiler averaged day after day 23 per cent CO_2, no CO and 600 deg. Fahr. stack temperature, giving a boiler efficiency of 73 per cent.

Efficiencies Possible With Good Burners

The curves in Figs. 1 to 7 show boiler efficiencies when burning blast furnace gas with various flue gas analyses and stack temperatures. They also show the efficiencies possible with good burners, proper baffling of boilers, and by economizers or air heaters. Seventy per cent efficiency is being obtained by modern burners under ordinary installations of small boilers, while higher efficiencies are obtained with larger units and boilers with longer gas travel.

The following shows how well it pays to install efficient burners, even in an old installation with only a few years more life. A 400-hp. boiler at 125 per cent average rating equals 500 boiler hp. If the boiler efficiency is increased only 10 per cent, say from 60 to 70 per cent efficiency, which is quite possible, as seen from the curves, the saving per hour is:

(tons of coal per hour at 60 per cent) — (tons of coal per hour at 70 per cent) × (price of coal) = (saving)

or $\left(\frac{500 \times 33479}{0.60 \times 13500 \times 2240} - \frac{500 \times 33479}{0.70 \times 13500 \times 2240}\right) \times \$5.00 = \$0.66$

At 300 days of operation, the saving per year is $300 \times 24 \times \$0.66 = \$4,752$.

Aspirating burners for a 400-hp. boiler can be installed complete at present prices for $800. Thus there is a yearly saving of about 600 per cent on the investment, and no repairs ever to be charged against the installation. In addition, there is a saving in labor, since hand regulation is practically eliminated. The 10 per cent saving is very conservative, as the difference between ordinary and good burners is usually higher, due not only to better combustion, but also to lower stack temperature on account of quick combustion. Because of rapid combustion and with dry cleaned gas, higher capacities are obtainable from the same setting, and troublesome boilers can often be eliminated by the installation of modern burners under the other boilers.

Pulverized Coal Theoretically Ideal

It has often been suggested that the future utilization of coal for power will consist entirely of the manufacturing of coke in by-product ovens, the gas being used in engines or as domestic fuel, and the coke being burned under boilers, full value of all the by-products being realized. This scheme is entirely logical, but at the present price of coal and demand for by-products it is not as yet attractive to power plant owners in this country, whether steelworks or public service corporations, on account of the tremendous outlay involved. Coke ovens are used only where there is a direct demand for coke or gas.

Theoretically, the next most nearly ideal way is to

burn the coal in powdered form. With this system cheaper buildings, excellent control, perfect mixing, and elimination of ash and excess air losses are obtainable, as well as extremely high efficiencies by the use of air heaters which are considerably less expensive than economizers. However, due to operating difficulties encountered, these advantages are not being fully attained in boiler practice.

When powdered coal is burned with the theoretical amount of air, a very high flame temperature is produced, which is hard on brickwork and which liquefies the ash produced. To eliminate brickwork trouble, and also the liquid ash, which in earlier installations coated the tubes, large quantities of excess air were used which did away with some of the operating trouble, but also with one of the advantages, namely, increased efficiency due to the elimination of excess air loss, which amounts to from 5 to 10 per cent in an average stoker installation.

How Powdered Fuel Should Be Used

The ideal and readily attainable installation will consist of a combustion chamber not any larger than for stoker practice, the burners being pointed downward, allowing the flame and gases to reverse through 180° before striking the tubes. The burner should be so designed that velocities above the critical will be obtained, which will give good mixing and perfect combustion with practically no excess air. The boiler should be equipped with integral air heater at the stack, using the heat in the waste gases.

The high flame temperature will slag a large part of the ash, which will be dropped into the bottom of the combustion chamber, from which it can be run out in liquid form. The balance of the ash will pass through the boiler and out of the stack, or can be removed in powdered form from soot pockets in the setting. The combustion chamber walls can be protected by passing the air from the air heater through them.

The present disadvantages of pulverized coal are:

(1) The initial expense of the pulverizing plant required.
(2) The labor necessary to operate safely the pulverized coal installation is as great as for stokers, unless the installation is very large.
(3) Danger of explosion or spontaneous combustion.
(4) Pulverized coal bins are required at the furnaces or boilers.
(5) Feeders and fans require power, same as stokers.
(6) Present feeders do not proportion correctly, i.e., for a given speed the feed varies due to different density, or aeration, and to varying moisture and fineness of coal.
(7) High cost of pulverizing.
(8) Coke breeze cannot be pulverized economically on account of its abrasive nature.

Engines and Turbines

To obtain the economies of electric drive in the steel works, and to meet the increasing electrical demand, larger turbines are being installed than formerly. While there are no exceedingly large units in steel plants, still there are many installations of from 10,000 to 20,000 kw., which sizes give good economy and compare quite favorably with central station practice. Units up to 45,000 k.w. in a single casing, and up to 60,000 k.w. in a three-casing machine, have been installed in some of the largest central stations, but turbines of this size are not required as yet for the steel industry, on account of the immense amount of steam-driven equipment in the plants and the desirability of having spares rather than tying all of the generating capacity up in one large unit.

The same conditions that have increased steam pressures for turbines and fostered the use of electric drive have caused pressures and temperatures for engines to approach those used in turbine practice. For instance, the latest reversing engine installation is designed for 225 lb. per sq. in. pressure and 125 deg. Fahr. superheat at the throttle. A noticeable feature of this engine is its simplicity and accessibility.

While the twin-tandem engine is standard in the United States at present, it seems as though, in order fully to utilize higher pressure and superheat, triple-tandem compound or multi-cylinder uniflow reversing engines may be the future competitors of electric drive. Triple-tandem engines have the advantage of lower inertia forces, in addition to being better able, on account of smaller cylinders, to use higher pressures and temperatures. Reversing uniflow engines have been built for locomotives and for boats, but not as yet for rolling mills in this country, although the manufacturers appear to be willing.

For continuous running mils the uniflow engine is rapidly coming into prominence. The early installations have shown great reliability, while the economy of the uniflow over wide load ranges is almost an accepted fact. In this country last year there were three new installations for driving rolling mills, two of which were duplex engines; also several electric power installations. Two 40 in. x 48 in. duplex uniflow engines, which have just been completed for hot mill drives, will develop an average of 2500 hp. and a maximum of 5000 hp. each. Two more uniflow engines, one a 28 in. x 42 in. duplex and the other a 40 in. x 48 in. single engine are now being built.

Governors have been developed with a very reliable and easily operated speed-changing device, so that all conditions of service can be met. In view of the numerous installations of electric mill drives, the status of the steam engine for roll drives appears to be dependent upon how much use is made of the economies to be effected by high steam pressures and temperatures, either by the use of pressure reducing turbines, or by direct application to the engine.

Blast Furnace Gas Engines

The modern blast furnace gas engine shows much greater reliability and a somewhat higher thermal efficiency than formerly; but the steam turbine plant, when high pressures and superheat are used, and all auxiliaries, such as gas washers, are taken into consideration, runs a pretty close second in regard to economy, and can be installed at a much lower figure. However, all of the possibilities of the gas engine have not been taken care of, although some work has been done along this line in this country and considerable in Europe.

By utilizing the heat of the exhaust and the heat of the jacket water the thermal efficiency of the entire system can be made at least double that of the engine alone. In one plant in the United States the exhaust is to be used to run a high-pressure boiler; in Germany low-pressure boilers and low-pressure turbines are used to some extent. In another plant the equivalent of 100 boiler hp. per 3000 k.w. engine is obtained by a very simple and inexpensive air heater, which is used to heat the buildings and which increases the back pressure on the engine less than two in. of water. However, this last is used only in winter, and could be made more effective, as up to 300 boiler hp. is readily available from the exhaust.

The use of jacket water as boiler feed water is another method of improving the economy of the system, by saving the jacket water loss, and enabling the gas engine to compete with steam-driven equipment in spite of high first cost. This is already being done, and other installations are contemplated, in connection with economizers, utilizing the heat in the exhaust gas. This is an almost ideal source of waste heat, as the jacket water is not contaminated and the exhaust gases are quite clean. The only consideration is not to create too high a back pressure on the engine.

Discussion by Richard H. Rice*

This paper indicates that the economies which I set forth in 1917 as being possible of realization in steel mills are now being obtained. The period since 1917 has been one of intense endeavor in the production of existing types of apparatus. During this period serious difficulties have been experienced with the material

*General manager Lynn works, General Electric Co.

used in steam turbine construction, due no doubt to the demands for intensified production which have been made upon steel mills and other sources of supply of raw materials.

Our endeavors to secure high quality of the materials used in turbine manufacture have led to development of additional means of safeguarding the construction of turbines by a more thorough and accurate examination of these materials. For example, we have developed and put into commercial operation a mechanism for the magnetic examination of turbine wheels, which has been found to point out accurately any hidden defects of magnitude which may exist in such wheels.

We have also been led to investigate more carefully the stresses which occur in the rotating and stationary structures. In particular we have developed and extended the investigation of distribution of stresses by means of photo-elasticity. This is accomplished by testing transparent materials in various ways and passing through such material, when under stress, beams of polarized light.† Much information has been thereby obtained concerning the distribution and character of stresses in the structures involved in turbine design, and improvements have been made in our designs in accordance with these investigations.

New materials have been developed which are suitable for use in buckets and nozzles, which give freedom from corrosion or rusting, and at the same time, considerable increase in the elastic limit. In addition, means have been found to construct buckets of much lighter section, so that the buckets impose much smaller stresses on the turbine wheel rim. Refinements of construction have also been developed in various other parts of the turbine, such as the diaphragms. These result in more accurately formed steam passages, with consequent improvement in economy, while increasing the strength and reliability of the structure.

Measured Progress Along Lines of Efficiency

As regards the progress made since 1917 in the development of the steam turbine we find that (using the steam consumption of the best turbines in the year 1903 as unity) in 1917 the steam consumption had been reduced to 50 per cent and in 1921 it has become 48 per cent, a reduction since 1917 of 4 per cent. A further reduction is confidently expected.

The weight per kilowatt of large steam turbines, which in 1903 was considered as unity, was 28 per cent in 1917, and has now fallen to 25 per cent.

Since 1917 the initial pressure used in large steam turbines has not been increased, but installations are now in contemplation which will raise the pressure from 300 lb. per sq. in., reported in 1917, to 350 lb. now, these pressures being, of course, at the turbine. Boiler pressures will be some 50 lb. higher.

Since 1917 no marked increase has been made in the use of initial temperature of steam due to superheat, but it is expected that instead of 650 deg. in use in 1917 we shall before long be using 750 deg.

The point in which we are chiefly interested, in discussing the improvement of power plants in general, is the heat consumption for the complete electric station. The curve showing this figure shows decrease in the heat consumption, bringing it down from 16,300 B.t.u. per kw.hr. in 1917 to 15,000 B.t.u. in 1921. To show that these figures are not optimistic, the monthly average of an actual plant, of rather small size and not on particularly steady load (since the average is a monthly one), indicates a consumption per kw.hr. of 17,130 B.t.u.

Plea for Larger Use of Electric Drive

Use of steam driven equipment scattered over the plant is not a desirable feature from the standpoint either of economy or of operation. The place to generate power for the plant is in the power station, and electrical transmission and electric utilization of this power is undoubtedly the method which is not only the most economical but also the best from the operating standpoint, having reference both to reliability and ease of handling. While great progress is being made in steel mills in the direction of substituting electric power for steam, air and other methods of transmission, there is yet a long distance to go before the mills will be in an ideal position in this matter.

Considerable improvement has been made in the efficiency of the turbo blower by the use of a high-class multi-stage turbine as a driver. An installation of this character, which is one of three units now in service on a blast furnace plant, uses 17 per cent less steam than those on which my computations were based in the 1917 paper.

In considering the proposal to utilize the heat in the jacket water and in the exhaust of gas engines, as a means of increasing the thermal efficiency of the gas engine system, the cost of this auxiliary apparatus, installed, and the cost of operating and maintaining it, should be carefully considered and proper charges for interest, depreciation, maintenance and operation set up as an offset against the increase of efficiency.

It is poor economy to submit to low vacuum conditions in condensing systems, as well as to the other disadvantages which often arise from the use of high temperature and impure river waters in the case of steel mills located on rivers where the temperature of the water is high and the quality is poor. Such mills will realize a substantial gain by the use of spray ponds and other means of securing the advantages of a closed system of water circulation. With this system the small quantities of make-up water needed can be treated at moderate expense. A considerable improvement in the vacuum realized in the surface condenser will result.

Recommendations to Promote High Economy

To summarize the requisites for high economy in a steel mill power plant using steam:

For the turbines:
- High pressure—300 to 350 lb. per sq. in. initial pressure.
- High superheat—to total temperature of 650 to 750 deg. Fahr.
- Lowest possible vacuum, secured by surface condenser and clean circulating water (if necessary by a closed circulating system and even spray ponds).
- Large turbine units, which have appreciably higher efficiency, both in fuel and in fixed charges.

For the boilers:
- Reasonable ratings for normal load, not over 200 per cent, with high rating for peak load. Steel jacket settings to reduce air leakage into furnace.
- Large stoker areas and few turns in boiler passes, with resulting small draft losses.
- Best possible gas burners and dry cleaners for gas.
- Large boiler units.
- Automatic control.
- Steel tube economizers.
- Air preheaters.

For the surface condensers:
- Save all condensate, treat and de-aereate all make-up water.

For the feed water:
- Heat by extraction from the main turbines or from the house turbines, in series in closed heaters, to secure maximum work from the heating steam.

For the auxiliary apparatus, pumps, fans, etc., in the boiler room:
- Electric motor drive from a house turbine or turbines.

For all apparatus about the mill such as hoists, cranes, charging apparatus, etc.:
- Electric motor drive and control.

Finally:
- Centralized power stations where all power is generated, to be transmitted electrically about the mill.

For the blast furnaces:
- Turbo blowers with accurate governing of air volume, corrected for barometer, temperature and humidity, one blower for each furnace.

In all cases the determination of value of apparatus and installation should be based on actual costs of operation, including fuel, labor, maintenance, depreciation, and interest charges.

Discussion by Arthur West*

It is the purpose of this discussion to cover briefly the improvements in gas power plants for steel mills. Three principal points worthy of attention are:

1. First cost of plant.
2. Relation of water supply to choice of gas or steam power plant.
3. Possibility of regular operation of gas plant with only one furnace in blast.

First Cost Discussed for a Concrete Case

Regarding first cost it should be noted that the gas engines and generators represent less than two-thirds

†*General Electric Review*, page 869 and 870, Nov., and page 960, Dec., 1920; page 82, Jan., page 222, March, and page 455, May, 1921.

*Assistant general superintendent Nicetown works, Midvale Steel & Ordnance Co., Philadelphia.

of the total cost of plant. It has been our experience that careful study of the layout of the gas cleaning plant and gas power plant in their relations to each other greatly reduces the total cost of plant by simplifying the building, excavation, piping, etc. The cost of a plant will vary considerably in different localities, according to whether or not it is necessary to drive piles for engine and building. I have prepared below a carefully itemized statement of cost of a complete 21,000-kw. gas power plant as follows:

		Cost per Kw.
1.	Six 3500-kw. twin tandem gas engines with six 4000-kva. alternating current generators, all erected complete	$80.00
2.	Power house building of steel, brick and concrete with tiled floors and vitrified tile three feet high around walls. Included in above is a steel and concrete building for gas washing apparatus and all excavation and foundation work for above buildings, but no piling	13.45
3.	Excavation and foundation for gas engines and generators	4.12
4.	All gas washing apparatus needed to prepare the raw furnace gas for gas engine use	4.40
5.	All switchboard and electric apparatus in power house, but not including any sub-stations	5.00
6.	All air, gas, water and exhaust piping in power house, including exhaust stacks	2.87
7.	Miscellaneous items, crane, railroad tracks in building, etc., oil tanks in building, and all other apparatus in building needed for successful operation	2.88
8.	Gas holder of 200,000 cu. ft. capacity	2.98
9.	Engineering and drafting	1.20
10.	Unforeseen contingencies	8.10
	Total cost of station ready to run, exclusive of real estate	$125.00

Some of our stations built during the war cost much less than the figure given, notwithstanding the fact that the gas engines were included at current selling price and not at our actual cost to build. All the various items quoted have been carefully modified to represent present day costs. They include all apparatus needed to clean and purify the raw gas as it leaves the furnaces, and also one gas holder of 200,000 cu. ft. capacity, the latter for a special purpose to be later described.

In these days of high capital charges the first cost of the station is of great importance. Since the figures here given include absolutely all auxiliaries, any comparison made with a steam plant should also include absolutely all auxiliaries such as boilers, furnaces for gas firing, economizers, stacks, feed-water apparatus, water softening plant, condensers and circulating pumps, turbines, etc. When this is done it will be found that there is no such discrepancy in the first cost of a steam and gas station as was formerly thought to be the case. The reduction in first cost of the gas station has been brought about in the same manner as in the case of the steam station, viz., by increasing the size of the power units and carefully studying the layout of the whole plant.

Water Supply for Steam and Gas Plants Compared

In many cases around a steel mill the water supply is either deficient in quantity or bad in quality. For such cases the gas station has a great advantage. By the use of cooling ponds or, where space is limited, by employing cooling towers, both the gas cleaning water and the gas engine jacket water may be used over and over again, the gas cleaning water and the engine jacket water being of course separately cooled. The water for gas plant does not require treatment and the only loss of water is that due to evaporation.

In the case of a steam plant, to produce a 28-in. vacuum with cooling ponds or towers requires 5.7 times as much circulating water as is required for the same gas power plant, including water for cleaning and cooling gas as well as engine jacket water. The make-up water required by such a steam plant with surface condensers is 3.5 times that required by the complete gas plant. With surface condensers the condensed steam is just about equal to the evaporation loss in cooling ponds, so that the new water required is practically the amount of the boiler feed. Where water is expensive these gains are important.

It should also be remembered that, to produce 28 in. vacuum, the cooling ponds or towers must cool the water from (say) 110 deg. Fahr. to 85 deg.; while the cooling ponds or towers in the case of the gas plant must cool it from (say) 155 deg. to 110 deg. The cooling pond is much more efficient at the latter temperature range than at the temperatures needed for vacuum producing. This, together with the fact that the gas cooling ponds or towers are called upon to handle less than 20 per cent of the water per kw. required for the steam plant, renders the cooling water plant and its auxiliaries very much less expensive than in the case of a steam turbine plant.

There are many cases around a steel mill where, even if water be obtainable, the cost of intake and other hydraulic arrangements is greater than cooling ponds or towers. With very muddy streams, or those subject to great seasonal change in flow, this is especially apt to be the case. Such considerations sometimes enormously affect both the first cost and the operating cost of a power plant. In every case we should consider all the elements entering into the production of kilowatts at the switchboard from raw gas at the furnace.

Gas Engine Operation with One Blast Furnace

It used to be thought that gas engines could not be used unless the plant consisted of three or more furnaces. Even with two furnaces in blast there was difficulty in operating gas engines reliably, due to possible changes in gas pressure while one furnace was casting. At our Sparrows Point plant we have for several months had only one furnace in operation. In this plant the demand for power does not, unfortunately, decrease with the requirements for pig iron. The cost of blowing furnaces and generating electric current by gas engines is so very much less than the cost of either doing the work by steam or purchasing power outside that our engineers at this plant had a strong incentive to keep the gas engines going on one furnace, a feat hitherto considered impossible to perform with safety. The difficulty has, however, been surmounted in the following way, which we hope to have more fully described later in a paper especially devoted to the subject.

Briefly, a gas holder of 200,000 cu. ft. capacity is connected to the gas main supplying the gas engines, by a pipe provided with a gate valve controlled by the pressure in the gas main at the engines. When this gas pressure falls below a predetermined minimum (which happens while the furnace is casting) the valve leading to the holder is automatically opened, thus preventing the gas pressure from falling below holder pressure during time of cast. When the furnace cast is over and gas is again going into the mains the valve leading to the gas holder remains open until the pressure reaches a predetermined maximum, this being reached only when the holder is full. When the gas pressure has thus reached the top limit the valve leading to the holder is automatically closed. The full holder is thus constantly in reserve, to keep the gas pressure at engines between the desired limits.

This apparatus is so successful that, for several months past, with only one 500-ton furnace in blast, we have been continuously operating four 3500-kw. gas-electric engines and the two 47 and 84 by 60-in. gas blowers required to blow the furnace. These six gas engines were thus developing about 24,000 brake hp. continuously from one furnace, without the aid of any steam apparatus whatever. Recording charts show that the gas pressure at engines never fell below 5 in. of water.

This arrangement has been in operation about four months and has proved thoroughly safe and practical. With this device it is evident that gas engines can be installed in any blast furnace plant, no matter how few the furnaces. This we feel is a radical step forward in the development of gas power around steel mills. The operation of this device at Sparrows Point has produced a saving over steam or purchased power at the rate of over $400,000 per year.

"Ready for a Slide" is the caption of a poster sent out by the National Safety Council, Chicago, the photograph representing foundry flasks piled helter skelter. The text reads: "Poorly piled flasks are dangerous. A slight jar is liable to send one or more of the flasks sliding and they may strike you or a fellow workman passing by."

MANY CONCESSIONS

Buying Awaits Lower Prices Based on Lower Costs in the Mahoning Valley

YOUNGSTOWN, OHIO, June 7.—Buying of iron and steel products is being held in abeyance largely until prices based on lower costs are realized. Pipe production of one district interest is devoted at present to small material to be used in construction enterprises. Another Valley maker is turning out an order for heavy sheets, the product to be used by a motor builder for pressed crankcases. Concessions are being granted by producing interests on virtually all finished commodities, though on small orders nominal quotations are generally upheld. Sales departments are combing their respective territories for new business, but few sizeable tonnages are coming out.

One steelworks interest reports that a quotation of $20 was made for a small lot of off-grade basic pig iron. The nominal asking price for standard basic is, however, from $21.50 to $22 in the Mahoning Valley.

In view of the general absence of buying, a veteran steel maker expresses the hope that there will be no deviation from the policy of mutual helpfulness and consideration which has marked the industry in times gone by and that there will be no revival of cut-throat competition such as has prevailed in some other periods of stress. He attributes the present somewhat critical condition of the industry, insofar as buying is concerned, to the sudden expansions during the war beyond the immediate requirements of the country. Normal needs, he states, will soon absorb this enlarged capacity.

In the Youngstown district the more important producing groups are well fortified financially and could weather a depression of prolonged duration. An indication of the attitude of the leading makers with regard to the immediate future is that they are making every effort to keep their operating organizations intact.

Sales executives state that steel consumers are disappointed by the comparative smallness of the wage reduction for railroad employees. The improbability of any early substantial lowering of freight charges is also acting as a deterrent.

There is no longer any question as to the instability of sheet quotations and concessions from the nominal prices are now generally accepted. Reductions have likewise been made on plates, strip, wire products and semi-finished material ranging from $2 per ton on plates to as high as $20 a ton on cold strips.

Certain large producing interests believe the market is tending toward lower levels and there is not the disposition to maintain existing prices which prevailed a month ago.

An interesting fact in connection with the current situation is that jobbers in many instances are handling a relatively larger volume of business than the makers, owing to the large amount of small-lot buying.

In the current market sheets, plates and wire products exhibit the least strength. Quotations on black common sheets as low as 3.50c. are heard. Full-finished sheets are in relatively fair demand, compared with the common grades, all of the inquiry coming from automobile makers. A non-integrated maker of deep drawn stock, for instance, has consistently maintained better operating schedules in this district than the larger, self-contained producers.

Though current tin plate orders are being filled by a district maker from stock material, nevertheless the market shows signs of some betterment, says an official of the company. The opinion prevails that a demand is accumulating which will result in greatly accelerated activity in this branch of the industry before the year ends. The bulk of the current inquiry is from condensed milk interests, the ordinary seasonal requirements from the fruit and vegetable packing industry having failed to show strength. A price as low as $5.50 has been done on stock tin plate.

A base of $3 for wire nails generally prevails in this territory.

SURPLUS STOCKS

Shipyard Steel Has Demoralizing Effect on Seattle Market

SEATTLE, June 1.—The flotation of surplus stocks of steel from the Skinner & Eddy shipyard, dismantled after the close of the war, has dislocated the market on many articles of steel and machinery in this territory. The stock has been parceled out to more than a dozen dealers, who are issuing price lists and endeavoring to dispose of the stock on the small parcel basis. The sale of considerable new stock has therefore been stopped.

The fir lumber mills, expecting a revival of the Eastern demand for lumber in August as representing the fall buying, have built up some good prospects for machinery, especially in large lathes. In many instances jobbers have secured the indorsement of purchasing agents for these mills on spot basis, but when passed on to the heads for approval there has been a halt. There is a brisk demand for cylinder regrinding tools for the automotive trade, the early summer having brightened considerably in the Northwest trade.

Due to agitation of taxpayers on the high cost of the school maintenance and a determined demand for retrenchment, the orders for machinery and tools for vocational and manual training technically placed last winter have been held up. The purchasing departments of the schools have accordingly been making some inquiries for used tools and machinery and have had about $1,000,000 of stock thrown at them, the bulk of which will come out of the shipyard stocks. Investigation by jobbers shows that there are more machinery and tools in the three shipyards assemblies now in the process of cleaning up than had been surmised, and competition of this sort is feared throughout the summer.

There is a brisk inquiry from the lumber mills for welding tools.

The Barde Industrial Co. has bought ground in the industrial section of the city on which will be erected warehouses for the housing and handling of steel and machinery carried by the corporation. Contracts for the buildings have been awarded and operations will commence August 1. About 60,000 sq. ft. will be occupied by the grounds and buildings, with an outlay of $250,000 for buildings alone. It is announced that 10,000 tons of steel, including bars, plates, beams and tool steel, all embraced in a large department are among the stocks to be kept. About 1,000,000 ft. of wire rope will be carried, in sizes from ¼-in. to 2 in. This department is expected to be the largest on the coast. Pipe, electrical tools, and rails will be prominently featured.

The Japanese steamship Moraisan Maru of the Mitsui fleet arrived in port to-day and will load 1000 tons of steel pipe for the Orient.

The Platt Wonder Pump Co., established here a year ago, has moved to large quarters, taking over the building formerly occupied by the Machinery Co. of America. Fifty expert mechanics have been employed. Officials of the company state that the domestic trade outlook is good. Five Northwest cities, King (Seattle) county and the Federal Government have recently purchased Platt pumps for waterworks systems.

Following a conference between purchasing agents of Pittsburgh and Youngstown, it was decided to hold the June meeting of the Purchasing Agents' Association of Pittsburgh in Youngstown on June 21. The members will visit the plants of the General Fireproofing Co. and the Republic Rubber Corporation during the day and will enjoy a banquet in the evening.

The Vacuum Oil Co. says it is not true that it recently purchased 1,000,000 oil barrels, as stated in THE IRON AGE of May 12.

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EDITORS:

A. I. FINDLEY WILLIAM W. MACON GEORGE SMART

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Freight Rates and Business

The unwise proposal has some support in Washington, that there be a horizontal reduction in freight rates. Were such a method of revision adopted the experience of many years before the war would go for naught, for to reduce rates horizontally would be yielding to popular talk that has nothing in it. The remark has been as widespread as it is groundless that business recovery is prevented by freight rates being too high. Surely a lesson should be drawn from the experiences before the war. We had ups and downs in business then, and in times of depression most of the allegations of causes proved unfounded, while most of the remedies proposed were found to be of no value. With particular insistence we heard at times that business would never be good until freight rates were advanced. Now we have been told that trade will not be good until freight rates are reduced. It is a psychological phenomenon, not a business diagnosis.

The idea of a horizontal reduction in freight rates misinterprets much of the talk that has been heard on the railroad problem. A readjustment or harmonizing in wage rates was requisite, as part of the industrial readjustment, and reductions in railroad wages were urged partly as an aid to completing readjustment in certain other lines. In the building trades in particular there has been crying need for wages to come down and working conditions to be modified along the line of efficiency and harder work; and to maintain an unreasonable wage basis on the railroads would retard the readjustment in the building trades and at other points where adjustment was needed.

We are in too serious a situation to let men nurse their grievance against the policy some railroad men used to follow in the old days, of charging "all the traffic will bear." It cannot be helped if it hurts the feelings of some men to adopt this policy, to an extent, in arranging freight rates in the future. It should be sufficient salve that the policy is adopted for the economic good of the country instead of for the financial benefit of individual railroads. According to the policy, a horizontal reduction, or anything approaching a horizontal reduction, would be the worst way to settle the matter of freight rates.

If the volume of railroad freight traffic were studied it would be seen that it does not show the depression to be as great as is conceived by those who think to increase the volume of business by reducing all freight rates. For instance, the freight ton-mileage last February was at a rate approximately equal to the average rate in the best year before the war, yet February is normally a month of traffic under the year's average. It is quite idle to expect to effect a great increase in freight traffic purely by the method of reducing freight rates in general.

As a remedy along psychological lines, reductions in freight rates are altogether to be commended, but if that is the case the reductions should be made chiefly in the rates that the public has found by concrete example to be plainly burdensome. It cannot be shown that all freight rates are too high for the total volume of business in the country to be what it used to be, but it has been shown plainly that certain rates are altogether too high to permit the lines of business involved to be conducted with facility. Those are the rates that should come down.

The increasing use of giant dirigibles of the R 34 type is brought to notice by the employment of one of them last week as a regulator of traffic for the British derby at Epsom Downs. From a height of some 2000 feet it was possible by wireless to direct automobile and vehicular traffic, which was unusually heavy because of the coal strike and lack of rail transportation. Of more practical interest are the figures for the exports and imports moved by air craft. Already the British Government has issued reports of foreign trade carried on by air transport, and its growth in the periods compared was very large, imports from France having been the heaviest. That aircraft will play no small part in international trade, particularly among European countries, seems assured. The possibilities in the United States are not so great, but ultimately the commercial airship may be a carrying agent not only between this country and Mexico and Canada, but also to South America. Steel, metallic products and other materials will ultimately find speedy transportation, and exports and imports

by aircraft will become a regular feature of statistical reports here and abroad. The electric furnace and the isolation of aluminum and magnesium are the main factors in this development, the combination of these light metals with themselves or with other metals, made stronger by heat treatment, being responsible for these giants of the air.

Outlook for the Eight-Hour Shift

As Mr. Schwab pointed out at the recent meeting of the American Iron and Steel Institute, if the iron and steel manufacturers profit by their experience during the present period of depression, the result will be highly beneficial to the industry. Certain it is that operating departments are having unusual opportunities for testing new methods. One of these opportunities is found in the adoption of the eight-hour shift in some of the large steel plants. This action has been taken to furnish employment to a larger number of men, and in the case of a large Youngstown company it was stated that as soon as conditions permit the twelve-hour shift will be restored. This announcement undoubtedly was made because the management of the company did not believe it to be the desire of the employees to work permanently upon an eight-hour basis with the accompanying reduction in wages, but it is entirely possible that experience with the eight-hour shift will indicate a method which will be satisfactory to all concerned for putting it into effect permanently.

As stated in these columns last week, the speeding up of the open-hearth process is promised by two methods of throttling the air supply so as to complete a heat in eight hours which ordinarily requires twelve. If this is really accomplished, it will be an important factor in bringing about the eight-hour shift, for a complaint often made by open-hearth workers has been that with the eight-hour shift some of the men would carry the great burden of work connected with the tapping and charging of the furnace, while others would get off lightly. With the charging and tapping recurring more frequently and with the number of workers increased (even though by something less than 50 per cent) the inequalities in work performed would be lessened.

In a recent article in the *Atlantic Monthly*, Philip Cabot tells of the efforts his brother, the founder of the Cabot Fund, made in 1910 to bring about a reduction of hours of workers of the Steel Corporation and urges that this step be taken at the present time, but he frankly admits that a radical change of this kind would be doomed to failure if inaugurated at a period not adapted to it. He admits that conditions preceding the World War were not favorable for the introduction of the eight-hour shift and says that it is fortunate for the cause of progress and reform that changes of fundamental character were not attempted. He adds: "If in 1912 the officials of the United States Steel Corporation had entered upon such a course, they would probably have been forced to abandon it by the exigencies of war, with its huge demand for production and coincident shortage of labor."

It is hardly competent for one, not directly connected with manufacturing problems which would be materially affected by such a change, to say that the moment has arrived for making it, but the attitude of some leaders of the steel industry is significant. Chairman Gary in his address at the annual meeting of the stockholders of the Steel Corporation, April 18, said the presidents of the subsidiary companies and a majority of others in positions of responsibility, were in favor of abolishing the twelve-hour day, and for this reason and because of public sentiment expected to decrease the working hours in the "comparatively near future." The outlook now is that the experiences of many plants and also the introduction of new methods will hasten the day.

Steel Production Costs

In periods of full employment for the steel mills there has been much reference to the low costs per ton attained. At such a time, when buyers are ordering or specifying for forward deliveries, mills are scheduled far ahead. Roll changes are infrequent, there are long runs on a given size or section and workmen endeavor to make new tonnage records.

Conditions now are absolutely reversed. Aside from the overhead per ton being particularly heavy on account of the light operation, small orders are being handled, nearly every order passing through the mill as a unit, necessitating frequent roll changes and making the amount of workmen's time per ton of output especially large. Apart from the factors of overhead and of high wage rates per hour there is this factor, greatly increasing the cost.

It has been urged often of late that industry has entered a period in which production costs must be governed by the selling prices obtainable, that if a manufacturer cannot sell his goods at cost he must reduce his cost until he reaches the point at which the buyer will place orders. There is something in this, as a general economic principle; but in the steel industry at any rate there are probably no manufacturers who require any further stimulus to the reduction of costs.

In one respect the production cost of finished steel is at the dictation of the buyer rather than at the dictation of the seller. In all business it is commonly recognized that when one purchases goods that are to be made "to order" he is properly asked to pay an extra price, because the cost is higher, and that goods sold at retail are priced higher than goods sold wholesale. While at one time or another a given specification for steel is made to order, there is essentially a great difference between adding the specification of a customer to a batch of specifications already in hand, for the size involved, merely adding the specification to the schedule, and making up a schedule for that one specification. There is also a great difference between selling a carload made up of numerous sizes or sections, all to be shipped within a very few days, and taking a specification for many carloads, when some of the carloads may be made up of a single size or section each and shipped at intervals according to mill convenience.

These things add greatly to the cost of production at this time, and they are things made by the buyer, who is getting goods made to order, and at retail. According to recognized principles of merchandising the producer is entitled to secure, if he can, his extra cost.

It is not good business to make retail sales at wholesale prices simply in expectation that eventually the retail business may grow to wholesale proportions. For the buyers to approach the sellers and say "We will become wholesale buyers if you will name us wholesale prices" is another matter. The steel trade has gone through this experience at various times in the past as, for instance, in the spring of 1909 and in the late weeks of 1911. Both buyers and sellers expect a repetition of the performance at some time in the future, the main question being when buyers will get in the position of being able to offer orders in such form as to reduce mill costs. With full mill activity costs would still be very high as compared with 1913, on account of wages and freight rates being much higher, but they would be materially lower than at present.

Checking the Census on Iron

When the Census Bureau places the 1919 products of blast furnace plants at $794,467,000, compared with $317,654,000 in 1914—an increase, "on the face of the returns," of 150 per cent—the thoughtful reader will wonder just how much the 1919 figure should be discounted to take care of the increased unit values placed on the pig iron produced. In a similar way, skepticism is aroused by the announcement of a gain of 206 per cent in the products of steel works and rolling mills—reported to have increased from $918,665,000 in 1914 to $2,812,775,000 in 1919.

By using a measuring stick in the shape of an average price of the product in each year under review, one may readily determine a quantitative ratio between the two years. Unfortunately, however, while this method is satisfactory in comparing similar products, it is of less assistance when the materials are essentially dissimilar—as wheat and steel and petroleum—unless we accept, for the time, at least, the theory that prices of 1914 form a basis to which we must return, or, per contra, that they were unduly low, and 1919 prices should be our future guide. But the latter have already been discounted, after first having been far outrun in 1920, and in a market yet without bottom one hesitates to apply even the prices current, knowing that a few months, at most, will probably render them in turn obsolete.

It happens that a composite price of rolled steel products in 1914, based on THE IRON AGE'S quotations, showed an average of $28.39 per ton, compared with a 1919 average of $63.24 per ton (2000 lb.). Similarly, a pig iron composite for 1914 was $13.88, while $29.37 was the corresponding figure for 1919. If we may assume that all the products reported by the Census Bureau under the two headings quoted varied in price, on the weighted average, in the same ratio as the two composite figures just mentioned, the figures of production as measured in 1914 dollars (or 1914 prices) appear as follow:

	1914	1919	Increase, Per Cent
Blast furnace products	$317,654,000	$374,376,000	17.9
Steel works and rolling mills	918,665,000	1,262,724,000	37.4

These percentages of increase are quite different from the 150 and 206 per cent, respectively, figured on the reported values. But they appear to be a fair measure of the absolute advance of the industry in quantity of production, regardless of all theories as to the permanency of any stipulated price level, and as such may be made the basis of similar comparisons when subsequent census figures tell of the progress made between 1919 and 1924.

Though 1914 and 1919 were both poor years in respect to production (1914 gave a rolled steel tonnage 18.5 per cent below the average of 1909 to 1913, inclusive, while 1919 was 17 per cent under the average of 1914 to 1918, inclusive) and hence it is unfortunate that they happened to fit into the Census Bureau's quinquennial schedule of statistics gathered. Nevertheless, they furnish, in their figures of production, definite confirmation of the analysis above given. Thus, the pig iron produced for sale in 1919 (8,690,227 tons) was 18.0 per cent above the 7,362,980 tons of 1914; and the steel rolled in 1919 (25,101,544 tons) was 36.7 per cent greater than the 18,370,196 tons of 1914.

The slump in international iron and steel demand is emphasized by the export statistics for April, those for the United States appearing in THE IRON AGE last week and the British data elsewhere in this issue. For the first time American and British iron and steel exports were practically on a parity in April, at 162,592 and 161,508 gross tons, respectively. With the coal strike on, the British movement in April was larger than was to be expected and exceeded that for March, but it was less than 40 per cent of the pre-war or 1913 record. The extent of the British decline is measured by the fact that the British exports to May 1, this year, were only 177,906 tons per month, which is less than the 1919 average of 188,519 tons per month. A different contrast is presented by the import figures. The British receipts in April were 111,535 tons, making this year's average 117,414 tons per month to May 1, as against imports of 195,200 tons per month in 1913. The interesting point is that while British imports continue high and exports are less than 40 per cent of the pre-war records, American exports are even now 67.5 per cent of the 1913 rate. In both cases, however, capacity, particularly American, has been increased greatly and a heavier export demand is necessary to a healthy and profitable operation of the industry of both countries.

Bids on Sheet Steel

WASHINGTON, June 7.—Max Solomon, a Pittsburgh scrap dealer, with an average price of $10.58, submitted the highest bid to the War Department for 20,000 gross tons of shell steel and forgings, located at points in the East and Middle West. The next highest bidder for the entire tonnage was the Hyman-Michaels Co., Chicago, at an average price of $8.99, while the Jones & Laughlin Steel Co., Pittsburgh, whose figure was $8.54, came next. The highest bid for any single lot was $12.15, submitted by Mr. Solomon.

Iron and Steel Institute in France

The autumn meeting of the Iron and Steel Institute will be held, by invitation of the Comité des Forges de France, in Paris on Monday and Tuesday, Sept. 5 and 6, 1921. Following the meeting alternative visits have been arranged to works in Lorraine and in Normandy. A party of the members have been invited also to visit the Creusot works of Schneider & Co.

REORGANIZATION PLANS

Secretary Hoover Making Effective His Ideas as to Co-operating with Industries

WASHINGTON, June 6.—Definite plans for a practical reorganization of the Bureau of Foreign and Domestic Commerce, to meet the existing commercial situation and problems involved in foreign trade, have already been made by Secretary of Commerce Hoover, as the result of the passage by Congress of the second deficiency bill carrying an appropriation of $250,000 for this work. Mr. Hoover announced yesterday that of the industrial groups that are to be organized, those relating to textiles, chemicals, coal, oil, leather products and food stuffs have been positively settled upon. The setting up of other groups is a question as to what they shall include in the way of their composition and their possibilities. Among these groups will be one relating to machinery, and if a steel group as such is not established, this industry will receive co-operation through one of a number of service committees that have been and are to be named. Another group will deal with specialties such as labor-saving devices, including typewriters.

Industrial Groups

Originally, it was the intention of Secretary Hoover to create 12 industrial groups, but it has not been definitely determined as to the number that will be set up, and no specific provision of this kind is made by Congress.

These groups will carry out the same parallel groupings that apply to the Bureau of Standards and the Bureau of the Census. The Bureau of Standards also was given $250,000 of the appropriation of $1,000,000 for the Bureau of the Census, for the continuation of investigation of structural materials for which $50,000 is allowed; for technical investigations in co-operation with industries upon fundamental problems involved in industrial development following the war, with a view to assisting in permanent establishment of the new industries developed during the war, including personal services of the District of Columbia and elsewhere, for which $100,000 was allowed, and for co-operation of the Bureau of Standards with Government departments, engineers and manufacturers, with regard to standardization and testing of instruments, equipment, tools, etc., for which $100,000 was allowed.

Four Groups

Groups under the Bureau of Foreign and Domestic Commerce, which is allowed two additional assistant directors, making four in all, will consist of the heads of divisions and assistants who will co-operate with service committees selected from the various industries. It is proposed to have two expert men for each group. The underlying plan is that with the Bureau of Foreign and Domestic Commerce and the Consular Service of the State Department acting as an agency for recruiting foreign commercial information, there shall be a link to bring the service into direct connection with the industries of the country for the promotion and development of foreign commerce. These divisions are to direct the foreign service so as to secure results needed by the industries themselves. At the same time, the industries are to distribute this preparation among these groups. The experts will make special investigations into particular trade conditions abroad requiring special skill. Detail plans that Mr. Hoover has in mind were set forth in THE IRON AGE of May 26.

Service Committees

Briefly, it is recognized that it is necessary to have experts in the respective trades in co-operation with the service committees on the industries, to assist the bureau in guiding the foreign service to particular results and to give encouragement to the industries to push ahead. Information involving vital facts of value to the industries would be collected, adequately prepared and distributed, and intended to show the directions in which commerce may be extended to the best advantage. Secretary Hoover has pointed out that the world is facing an entirely new era in foreign trade, and due to the economic conditions abroad, there is a growing tendency to consolidate for militant export purposes in practically every country in Europe. He spoke both of the consolidation of industrial concerns by mergers of capital and of the direct combination of exporters for unity in the exploitation of foreign markets. If these combinations are met, he holds that it is necessary to secure more collective action on the part of the American industries and that it is at least necessary to furnish special information upon which America can act and that such information must be secured under expert direction.

Another factor in foreign commerce requiring a great deal of study is foreign combinations for imports. This results in the whole buying for a nation of a given commodity, so that these combinations may more or less dictate prices within the United States. Consequently, it is maintained that it is necessary to have a general staff of specialists to work out, in co-operation with American industries, policies and methods to meet these forces.

Addressing an informal gathering of business men in Franklin, Pa., on June 3, Charles M. Schwab, chairman Bethlehem Steel Corporation, said he would not want to see an immediate return of prosperity in America. "If we were to recover quickly from our depression," he said, "we should find ourselves back in a period of abnormal times such as we have just passed through." Mr. Schwab's visit to Franklin was in connection with an inspection of the new plant there of the Chicago Pneumatic Tool Co.

The Interstate Iron & Steel Co. turned over its new continuous merchant mill at South Chicago on June 5. The mill contains six stands of 16-in. roughing, two 14-in. finishing stands and four 12-in. finishing stands. Running full the mill will roll 75,000 tons per year.

The Iron Age and Its Readers

In spite of the suddenness with which to many in business came the flood of cancellations and the collapse of buying in the fall of 1920, it remains true that a careful reading—not a mere perusal—of THE IRON AGE market summaries must have brought hints to the wary—hints to which many were not receptive, such was their confidence that the pace was good for another year or two. Some letters from our readers in the first half of the year showed how doubts were being raised that demand could long keep on at the then high rate. Some of the straws showing some movements to the surface trend were the following:

On Jan. 22, 1920, was noted a sharp drop in export buying; on Feb. 19 was emphasized the caution being shown in financial circles and the suspension of some steel shipments; on Feb. 26 was reported the hesitation of one group of buyers; on March 25 was published a hint that some of the leaders in the trade expected an easing of premium prices in the second quarter of the year and that some ship material cancellations had occurred; on April 1, a series of predictions was made of easier conditions, followed by still others in the week of April 8. Then came the railroad strike, which clouded the issue, but on May 6 came the suggestion that mills would shortly be able to take care of the proffered business, particularly with the diminution in shipbuilding and tank construction; and then on June 3 were recorded the first reports of automobile plant cancellations or suspensions at a time when the slowing up of automobile manufacture was generally not believed.

IRON OUTPUT STILL LOW

May Production at About Same Rate as in April

Net Loss of Six Furnaces—Manganese Alloy Output Lowest in 20 Years

The rapid decline which has characterized the country's blast furnace output in recent months appears to have ceased with the May production which, while at a slightly less daily rate than that in April, is a little larger as to total than the previous month. The increase in the May total over April was 28,180 tons, with a decrease in daily rate of 374 tons per day. The production, however, is at a very low rate, the next lowest on record having been in July, 1908, when the total was 1,218,129, as compared with 1,221,221 last month. The net loss in furnaces blown out or banked in May was six or the same as in April, which makes the net loss in the last eight months 229 furnaces.

The production of coke and anthracite furnaces in May, a 31-day month, amounted to 1,221,221 gross tons, or 39,394 tons per day, as compared with 1,193,041 tons, or an average of 39,768 tons per day in April, a 30-day month, and with 1,595,522 tons, or 51,468 tons per day in March, a 31-day month. In May, 1920, the total output was 2,985,682 tons, or 96 312 tons per day. The total furnaces in blast on June 1 was 90, compared with 96 on May 1, with 102 on April 1 and 201 on Jan. 1. The 90 in blast June 1 had a capacity of 38,080 tons per day, as compared with 38,505 tons per day for the 96 in blast on May 1 last. There were 13 furnaces blown out or banked and seven blown in during May.

A feature of the May output was the rapid decline in production of ferromanganese and spiegeleisen, the total of 9232 tons being the lowest since before the war. In January, 1911, the total output of these two alloys was 8360 tons, which marks the lowest previous record. Of the May output, this year, 6853 tons was ferromanganese. This contrasts with an output in April this year of 9466 tons of ferromanganese and with a total for the two alloys of 24,310 tons.

Daily Rate of Production

The daily rate of production of coke and anthracite pig iron by months, from May, 1920, is as follows:

Daily Rate of Pig Iron Production by Months—Gross Tons

1920	Steel Works	Merchant	Total
May	68,668	27,644	96,312
June	73,659	27,792	101,451
July	71,954	26,983	98,937
August	72,740	28 789	101,529
September	74,908	29,402	104,310
October	77,214	28,998	106,212
November	71,669	26,161	97,830
December	66,037	20,185	87,222
January, 1921	62,327	15,618	77,945
February	58,060	11,127	69 187
March	42,691	8,777	51,468
April	33,854	5,914	39,768
May	33,054	6,340	39,394

The figures for daily average production, beginning with January, 1915, are as follows:

Daily Average Production of Coke and Anthracite Pig Iron in the United States by Months Since Jan. 1, 1915—Gross Tons

	1915	1916	1917	1918	1919	1920	1921
Jan.	51,659	102,746	101,643	77,799	106,525	97,264	77 945
Feb.	59 813	106,456	94,473	82,835	105,006	102,720	69,187
Mar.	66,575	107,667	104,882	103 648	99,685	108,900	51,468
Apr.	70,550	107,592	111,165	109,607	82,607	91,327	39.768
May	73,015	108,422	110 238	111,175	68,002	96,312	39,394
June	79 361	107,053	109 002	110,793	70,495	101,451	.....
July	82,691	104,017	107,820	110.354	78.340	98.931	.....
Aug.	89,666	103,346	104 772	109,341	88,496	101 529	.....
Sept.	95,085	106,745	104,465	113,942	82 932	104,310	.....
Oct.	100,822	113,189	106,550	112,482	60,115	106 212	.....
Nov.	101,244	110,394	106 859	111,802	79,745	97,830	.....
Dec.	103 333	102,537	92,997	110,762	84,944	87 222	.....

Production of Steel Companies—Gross Tons

Returns from all furnaces of the United States Steel Corporation and the various independent steel companies, as well as from merchant furnaces producing ferromanganese and spiegeleisen, show the following totals of steel making iron, month by month, together with ferromanganese and spiegeleisen. These last, while stated separately, are also included in the columns of "total production."

Production of Steel Companies—Gross Tons

	Total Production			Spiegeleisen and Ferromanganese		
	1919	1920	1921	1919	1920	1921
Jan.	2,436 022	2 [illegible]	1 932.159	32,787	23 957	22 228
Feb.	2,209 470	2 [illegible]	1 625 695	28,105	28.038	29,013
Mar.	2,277 507	2 [illegible]	1 323.443	26,644	35 275	41,294
Apr.	1,838 677	1 [illegible]	1.015.621	17.308	27,628	24,310
May	1 586 805	1 [illegible]	1.024 678	14,604	33,407	9,232
June	1,655 944	2 [illegible]	.....	14,254	34,751	.....
July	1,906 604	2 [illegible]	.....	14,805	36.789	.....
Aug.	2,108,563	2 [illegible]	.....	17,419	36,985	.....
Sept.	1,828 613	2 [illegible]	.....	20,631	39,546	.....
Oct.	1 295 690	2 393.644	.....	20.238	34.786	.....
Nov.	1,727,656	2 150,075	.....	19,964	26,944	.....
Dec.	1,916,249	2,047,167	.....	15.718	28,023	.....

Capacities in Blast June 1

The following table shows the number of furnaces in blast June 1 in the different districts and their capacity, also the number and daily capacity in gross tons of furnaces in blast May 1:

Coke and Anthracite Furnaces in Blast

		June 1		May 1	
Location of Furnaces	Total Stacks	In Blast	Capacity per Day	In Blast	Capacity per Day
New York:					
Buffalo	22	3	1,200	3	1,175
Other New York	4	0	...	0	...
New Jersey	4	2	330	2	330
Pennsylvania:					
Lehigh Valley	18	3	1,125	4	1,510
Spiegel	2	0	....	0	...
Schuylkill Valley	15	2	785	2	680
Lower Susquehanna	10	2	790	2	715
Ferro	0	0	...	0	...
Lebanon Valley	8	0	...	0	...
Ferro	2	1	65	1	70
Pittsburgh District	55	18	8,700	18	9,580
Ferro and spiegel	4	1	110	4	615
Shenango Valley	19	2	900	2	975
Western Penn.	26	6	2,000	7	2,360
Ferro and spiegel	0	0	...	0	...
Maryland	6	1	450	1	400
Wheeling District	15	1	580	1	500
Ohio:					
Mahoning Valley	27	5	2,400	7	3,400
Central and Northern	26	8	4,140	8	3,590
Southern	16	4	1,010	3	635
Illinois and Indiana	42	15	8,100	15	7,075
Mich., Wis. and Minn.	11	3	1,335	2	895
Col., Mo. and Wash.	7	2	760	2	790
The South:					
Virginia	16	2	175	3	355
Kentucky	7	0	...	0	...
Alabama	40	9	3,125	8	2,775
Ferro	1	0	...	1	80
Tenn., Ga. and Texas	16	0	...	0	...
Total	419	90	38,080	96	38,505

Output by Districts

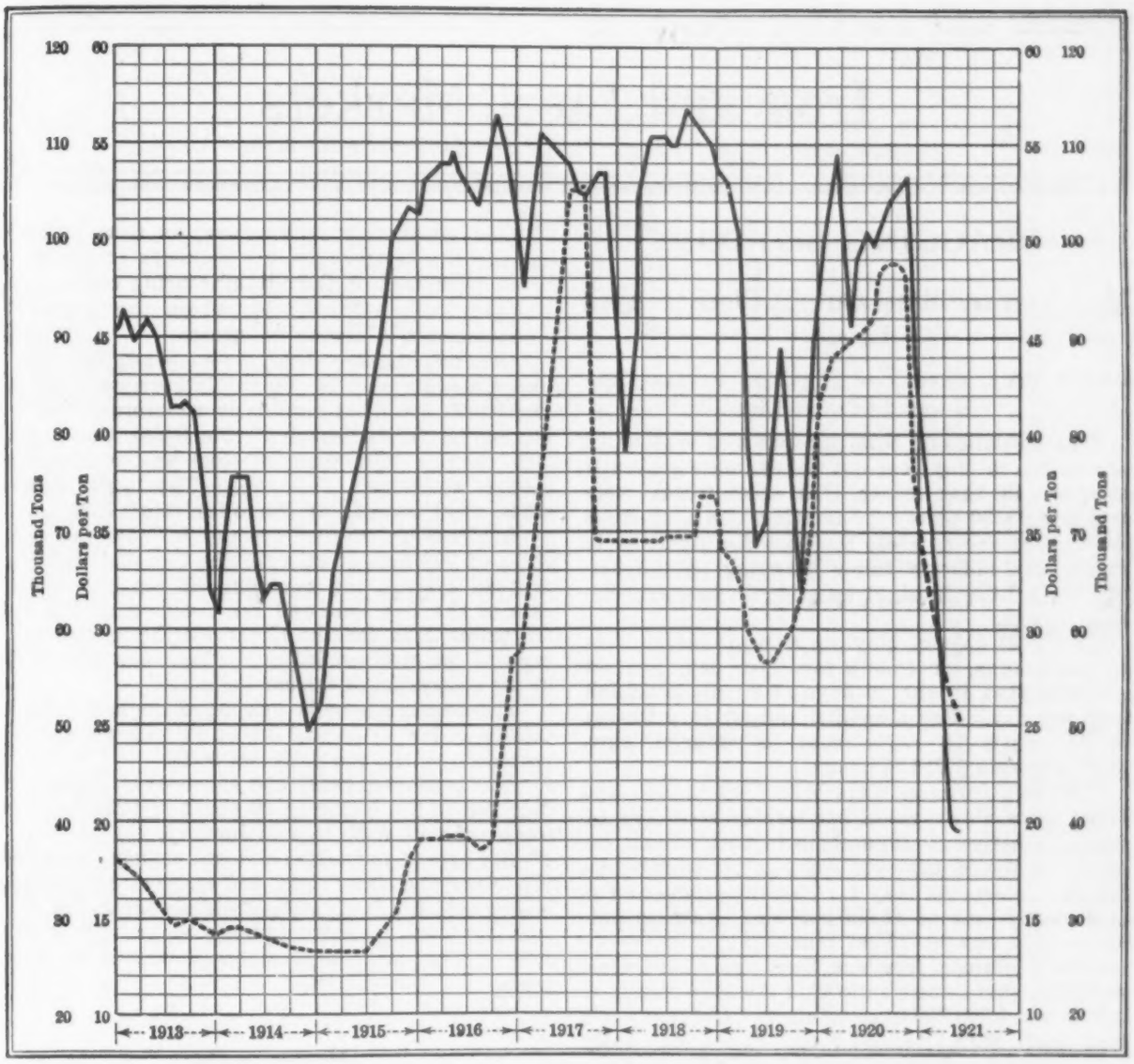
The accompanying table gives the production of all coke and anthracite furnaces for May, and the three months preceding:

Pig Iron Production by Districts, Gross Tons

	May (31 days)	April (30 days)	March (31 days)	Feb. (28 days)
New York	37.202	41,223	82,559	99,019
New Jersey	10.291	9.875	9,307	3,858
Lehigh Valley	42,289	45,329	48,256	45,281
Schuylkill Valley	24,471	21,279	28,631	26,677
Lower Susquehanna and Lebanon Valleys	26,491	24,799	24 521	26,911
Pittsburgh district	281,391	304,308	387,966	486,669
Shenango Valley	27,981	30,763	52,516	83,064
Western Penna.	73,661	70,930	83,350	76,697
Maryland, Virginia and Kentucky	20,781	17,575	22,069	23,165
Wheeling district	17,981	1,991	54,573	93,477
Mahoning Valley	87,090	102,826	132,482	177,411
Central and Northern Ohio	133,801	107,747	137,925	166 571
Southern Ohio	29,103	11,843	4,547	12,200
Illinois and Indiana	249,671	239,585	344,675	406,222
Mich., Minn., Mo., Wis., Colo. and Wash.	65,004	68,058	80,539	81,812
Alabama	94,013	94,910	101,484	124,513
Tennessee	none	none	122	3,710
Total	1,221,221	1,193,041	1,595,522	1,937,257

Diagram of Pig Iron Production and Prices

The fluctuations in pig iron production from 1913 to the present time are shown in the accompanying chart. The figures represented by the heavy line are those of daily average production by months of coke and anthracite iron. The dotted curve on the chart represents monthly average prices of Southern No. 2 foundry pig iron at Cincinnati, local No. 2 foundry iron at furnace at Chicago, and No. 2X at Philadelphia. They are based on the weekly quotations of THE IRON AGE.



The Full Line Represents the Daily Production of Pig Iron and the Dotted Line Is the Average of the Price Per Ton of No. 2 Southern Pig Iron at Cincinnati, Local No. 2 Iron at Chicago and No. 2X Iron at Philadelphia

Production of Coke and Anthracite Pig Iron in the United States by Months, Beginning Jan. 1, 1917—Gross Tons

	1917	1918	1919	1920	1921
Jan.	3,150,938	2,411,768	3,302,260	3,015,181	2,416,292
Feb.	2,645,247	2,319,299	2,940,168	2,978,879	1,937,257
Mar.	3,251,352	3,213,091	3,090,243	3,375,907	1,595,522
Apr.	3,334,960	3,288,211	2,478,218	2,739,797	1,193,041
May	3,417,340	3,446,412	2,108,056	2,985,682	1,221,221
5 mos.	15,799,837	14,678,781	13,918,945	15,095,446	8,363,333
June	3,270,055	3,323,791	2,114,863	3,043,540	.....
July	3,342,438	3,420,988	2,428,541	3,067,043	.....
Aug.	3,247,947	3,389,585	2,743,388	3,147,402	.....
Sept.	3,133,954	3,418,270	2,487,965	3,129,323	.....
Oct.	3,303,038	3,486,941	1,863,558	3,292,597	.....
Nov.	3,205,794	3,354,074	2,392,350	2,934,908	.....
Dec.	2,882,918	3,433,617	2,633,268	2,703,855	.....
Total, yr.*	38,185,981	38,506,047	30,582,878	36,414,114	.....

*These totals do not include charcoal pig iron. The 1919 production of this iron was 327,097 tons.

Among the furnaces blown in during May are the following:

The Princess furnace in Virginia; United furnace in central Ohio; Jisco furnace in southern Ohio; No. 1 and No. 4 Joliet furnaces of the Illinois Steel Co. in Illinois; one furnace of the Minnesota Steel Co. in Minnesota and the Alabama City furnace of the Gulf States Steel Co. in Alabama.

Among the furnaces blown out or banked during May were the following:

One Bethlehem furnace in the Lehigh Valley; Nos. 1 and 3 Isabella furnaces of the Carnegie Steel Co. and one Monongahela furnace of the National Tube Co. in the Pittsburgh district; Saxton furnace in western Pennsylvania; two furnaces of the Virginia Iron, Coal & Coke Co. in Virginia; Grace furnace of the Brier Hill Steel Co. and the Cherry Valley furnace in the Mahoning Valley; No. 4 furnace of the National Tube Co. in northern Ohio; Nos. 1 and 2 Gary furnaces of the Indiana Steel Co. in Indiana and one Bessemer furnace of the Tennessee Coal, Iron & Railroad Co. in Alabama.

Bids on Steel Tanks

WASHINGTON, June 7.—The Pittsburgh-Des Moines Steel Co. appears to have been the lowest bidder for supplying the Emergency Fleet Corporation with 14, 55,000-bbl. steel tanks. This company submitted a bid of $10,985 for each tank when using its own material and $8,377.90 if it is to do the work of fabricating only and the material supplied by the Fleet Corporation. Each tank is to be 144 ft. 7 in. by 30 ft. 4 in. and involves approximately 200 tons of plates. Prices quoted are on an f.o.b. basis at manufacturers' plants. Among other quotations were the following, the first set of figures calling for the supplying of steel by the fabricators and the second by the Fleet corporation: American Bridge Co., $11,464.30; $10,341.42; Riter-Conley Co., Pittsburgh, $11,780; $9,740; Pressed Steel Car Co., Pittsburgh, $12,567; $11.569; Petroleum Iron Works Co., Sharon, Pa., $11,700; $8,985; Reeves Bros. Co., Alliance, O., $12,500; $10,072; Youngstown Boiler & Tank Co., Youngstown, O., $11,928; $11,025.

Iron and Steel Markets

DRAGGING BOTTOM

May Iron and Steel Output Close to April Level

Lower Wire, Sheet and Pig Iron Prices—Concessions in Other Lines

The statistics of both pig iron and steel ingot production in May bear out the estimate generally accepted in that month that steel works were averaging a 30 per cent operation. In both cases the figures are so close to those for April as to suggest an industry fairly dragging on the bottom, with little in sight pointing to any appreciable change.

In the 31 days of May pig iron production was 1,221,221 tons, or 39,394 tons per day, against 1,193,041 tons in the 30 days of April, or 39,768 tons per day. For a smaller output in a 31-day month nearly 13 years must be retraced, July, 1908, showing 1,218,129 tons.

Thirteen furnaces were blown out in May and seven were blown in—a net loss of six. The 90 furnaces active as June came in had a daily capacity of 38,080 tons per day against 38,505 tons for 96 furnaces on May 1. Current production is at a yearly rate of 14,000,000 tons, whereas output in 1920 was 36,925,987 tons.

The American Iron and Steel Institute's steel statistics, just issued, show that the May output of ingots was 1,503,206 tons, or about 4 per cent more than April, with 1,441,537 tons. At the May daily rate annual production would be 17,980,465 tons. Output in both 1917 and 1918 exceeded 43,000,000 tons.

The volume of current business has if anything fallen off in the week. Definitely lower prices have been established in wire products, and in black and blue annealed sheets. Concessions are made in other finished steel lines, but owing to paucity of the orders price shading is not general.

Plain wire is now quoted at $2.75 per 100 lb., wire nails at $3 per keg and galvanized barbed wire at $3.85 per 100 lb., all $5 a ton below prices recently obtaining, and even some shading of the $3 nail price is reported. Black sheets are down $3 a ton to 3.85c., Pittsburgh, and blue annealed, $4 a ton, to 2.90c. On two carloads of plates, less than 2c. a pound, Pittsburgh, was named and in Indianapolis 500 tons of steel bars were sold at 2c. On 400 tons of hard steel bars for the Government at Norfolk, the low price was 1.85c.

The largest transaction of the week in pig iron is the purchase of 25,000 tons of foundry grades by a cast iron pipe company at a price several dollars lower than $22, Birmingham, which has been the prevailing quotation. Basic, Bessemer and malleable iron have declined $1 and foundry grades 50c. to $1 in the Pittsburgh district, and similar reductions in foundry irons are reported in other centers, while nominal advances in eastern Pennsylvania have not been followed by sales. Basic has sold at Chicago at $20, local furnace.

One reassuring development is that jobbers serving the farmers are buying more freely than those dependent on the manufacturing trade, particularly in the Northwest, where the improved wheat market is having its effect.

General highway bridge and other construction promises still to absorb large quantities of structural steel but especially concrete reinforcing bars. A stadium for Ohio State University will require 4500 tons of steel and a Masonic Temple at Detroit, 7000 tons. The larger fabricated steel awards of the week total 7000 tons.

Business on railroad account includes the purchase of 500 tons of rails for the Cleveland electric railroad system, the awarding of repairs of 500 cars of the Soo Line and the ordering of 500 refrigerator cars for the Great Northern, although most of the steel needed in the last case is already in the possession of the car builder.

Track bolts and spike prices are unsteady. Quotations as low as 3c. and 3.10c., Pittsburgh, are reported on spikes and 3.62c. on bolts.

The ferromanganese and spiegeleisen output in May fell to the lowest in 20 years or 9232 tons as compared with 8360 tons in January, 1911.

For export, inquiries originate principally in the Far East and are chiefly for railroad equipment, among which are nine steel bridges for Japan and cars and locomotives for Chinese roads. About 500 tons of large diameter steel pipe is wanted for Formosa.

Pittsburgh

PITTSBURGH, June 7.

While there is no doubt in the minds of the iron and steel trade here that consumption exceeds production, no very definite idea yet has been formulated as to how long the industry must withstand the present stagnation of busines for the reason that there are no reliable statistics as to the stocks in second and third hands and, without this information, it is impossible to accurately forecast when necessity will compel more liberal purchases. A water works engineer can readily estimate how long it will take to empty a reservoir when the inflow and outflow are known and, based on production and consumption, it might be possible to set a time when the iron and steel business would recover. The difficulty now is that iron and steel reserves are an unknown quantity.

Business has not improved in the past week; on the contrary, the more common report is that it has declined further. Buyers hold fast to the belief that lower prices are ahead and are suiting their purchases to this idea. The week has developed definitely lower prices in wire products and in black and blue annealed sheets. The downward movement is neither pronounced nor general, as there are several manufacturers who are disposed to shut down their plants rather than actively compete for a share of the small business that is being offered. The decline in wire products has once more proven the fact that price reductions at this time are not an effective means of stimulating business.

Pig iron prices have suffered further recessions running from 50c. to $1 a ton and curtailment of steel works operations finds reflection in a similar decline in prices of scrap iron and steel.

Although coke production is at the lowest point

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	June 7, 1921	May 31, 1921	May 10, 1921	June 8, 1920
No. 2X, Philadelphia‡	$25.50	$25.50	$25.84	$47.15
No. 2, Valley furnace†	*22.50*	23.00	23.50	45.00
No. 2 Southern, Cin'ti†	26.50	26.50	26.50	45.60
No. 2, Birmingham, Ala.†	22.00	22.00	22.00	42.00
No. 2, foundry, Chicago*	*21.50*	22.00	23.00	43.00
Basic, del'd, eastern Pa.	25.00	25.00	25.00	44.80
Basic, Valley furnace	*21.00*	21.75	22.00	43.50
Bessemer, Pittsburgh	*24.96*	25.96	25.96	44.40
Malleable, Chicago*	*21.50*	22.00	23.00	43.50
Malleable, Valley	*23.00*	24.00	24.00	44.00
Gray forge, Pittsburgh	*23.46*	23.96	23.46	43.40
L. S. charcoal, Chicago	37.50	37.50	37.50	57.50
Ferromanganese, del'd.	*75.00*	80.00	85.00	225.00
Rails, Billets, etc., Per Gross Ton:				
Bess. rails, heavy, at mill	$45.00	$45.00	$45.00	$55.00
O.-h. rails, heavy, at mill	47.00	47.00	47.00	57.00
Bess. billets, Pittsburgh	37.00	37.00	37.00	60.00
O.-h. billets, Pittsburgh	37.00	37.00	37.00	60.00
O.-h. sheet bars, P'gh	39.00	39.00	39.00	80.00
Forging billets, base, P'gh.	42.00	42.00	42.00	85.00
O.-h. billets, Phila.	42.74	42.74	42.74	64.10
Wire rods, Pittsburgh	48.00	48.00	48.00	75.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh., lb.	2.20	2.20	2.20	2.75
Skelp, sh. steel, P'gh, lb.	2.20	2.20	2.20	3.00
Finished Iron and Steel, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.25	2.25	2.35	4.25
Iron bars, Chicago	2.25	2.25	2.38	3.75
Steel bars, Pittsburgh	2.10	2.10	2.10	3.50
Steel bars, New York	2.48	2.48	2.48	4.02
Tank plates, Pittsburgh	*2.00*	2.20	2.20	3.50
Tank plates, New York	*2.38*	2.58	2.58	3.77
Beams, etc., Pittsburgh	2.20	2.20	2.20	3.10
Beams, etc., New York	2.58	2.58	2.58	3.27
Steel hoops, Pittsburgh	2.75	2.75	2.75	5.00

Sheets, Nails and Wire, Per Lb. to Large Buyers:	June 7, 1921	May 31, 1921	May 10, 1921	June 8, 1920
	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh.	*3.85*	4.00	4.00	5.50
Sheets, galv., No. 28, P'gh.	5.00	5.00	5.00	7.00
Sheets, blue an'l'd, 9 & 10.	*2.90*	3.10	3.10	4.50
Wire nails, Pittsburgh	3.00	3.00	3.00	4.00
Plain wire, P'gh	*2.75*	3.00	3.00	3.50
Barbed wire, galv., P'gh.	*3.85*	4.10	4.10	4.45
Tin plate, 100-lb. box, P'gh.	$6.25	$6.25	$6.25	$7.00
Old Material, Per Gross Ton:				
Carwheels, Chicago	*$13.50*	$14.00	$15.00	$35.50
Carwheels, Philadelphia	18.00	18.00	16.00	38.00
Heavy steel scrap, P'gh.	*13.00*	13.50	13.00	25.00
Heavy steel scrap, Phila.	*11.50*	12.00	12.00	22.50
Heavy steel scrap, Ch'go.	11.50	11.50	11.50	22.00
No. 1 cast, Pittsburgh	*17.00*	18.00	18.00	32.00
No. 1 cast, Philadelphia	*17.50*	18.00	18.00	37.00
No. 1 cast, Ch'go (net ton)	*13.00*	13.50	13.50	35.50
No. 1 RR. wrot. Phila.	15.00	15.00	15.00	33.00
No. 1 RR. wrot, Ch'go (net)	*10.00*	10.50	10.50	25.00
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	*$3.00*	$3.25	$3.25	$14.00
Furnace coke, future	*3.25*	3.40	3.40	14.00
Foundry coke, prompt	4.50	4.50	4.50	15.00
Foundry coke, future	5.00	5.00	5.00	15.00
Metals, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	*13.00*	13.25	12.75	19.00
Electrolytic copper, N. Y.	*13.00*	13.25	12.50	19.00
Zinc, St. Louis	*4.55*	4.75	4.95	7.75
Zinc, New York	*5.05*	5.25	5.45	8.10
Lead, St. Louis	*4.50*	4.70	5.00	8.50
Lead, New York	*4.75*	5.00	5.00	8.75
Tin, New York	*29.00*	31.50	32.25	49.25
Antimony (Asiatic), N. Y.	*5.20*	5.25	5.25	8.75

*The average switching charge for delivery to foundries in the Chicago district is 70c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

in years, still lower prices have been reached in the past week. New prices show operators substantial losses, but business is accepted at these prices because even greater losses would be sustained by complete suspension of the mines and ovens.

Pig Iron.—The only important business recently done has been the purchase by an Allegheny Valley sheet maker of approximately 2000 tons of basic iron at delivered prices of $22.25 to $22.50. The iron was sold by middlemen and while definite details are withheld, it is the common impression that the iron will not come from any of the Valley furnaces. Deducting the freight from the Valley of $1.96 per ton would mean about $20.25 to $20.50, furnace, if the iron were coming from the Valley. One lot of 500 tons of basic iron recently was sold at $21, Valley furnace, and this now measures the market on this grade, especially in view of the fact that merchant producers have expressed a willingness to take business at that figure. Bessemer iron has been sold at $23, Valley furnace, in small lots and that price represents the present maximum possibilities with regard to prices. Malleable iron has been offered at $23, Valley furnace, and possibly could be bought for less. The market on No. 2 foundry iron is quotable from $22.50 to $23, but the latter is more of an asking than a selling price. The American Radiator Co. is reported to have bought considerable foundry iron for its several plants around $21 from lake furnaces. Average prices of pig iron from Valley furnaces for the month of May as compiled by W. P. Snyder & Co. show that basic brought $21.87½ or 62.5c. below the April average and Bessemer $24.25, a decline of 75c. from April average. The Standard Sanitary Mfg. Co. recently bought 200 tons No. 2 foundry for its Louisville plant at $22, Birmingham, this price being quoted by all makers in that district.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.96 per gross ton:

Basic	$21.00
Bessemer	23.00
Gray forge	$21.50 to 22.00
No. 2 foundry	22.50 to 23.00
No. 3 foundry	22.00 to 22.50
Malleable	23.00

Billets, Sheet Bars and Slabs.—Few now active in the business can recall a time when demand was at such a low ebb. Prices established April 13 find fairly close observance, but it would be exaggeration to call the market firm in the absence of inquiries which would provide a test. Demand is held on check, not only the slow demand for finished products, but because supplies of billets, sheet bars and slabs are ample and buyers see no reason to expect higher prices.

We quote 4 x 4-in. soft Bessemer and open-hearth billets at $37; 2 x 2-in. billets, $39; Bessemer and open-hearth sheet bars, $39; slabs, $38; forging billets, ordinary carbons, $42, all f.o.b. Youngstown or Pittsburgh mills.

Ferroalloys.—The market here is dull, unsettled and weak. The largest inquiry now on the market is for 5 tons of spiegeleisen for third quarter delivery from a steel maker outside the Pittsburgh district, and it is probable that the prospective buyer will decide eventually to buy by the month, instead of placing his tonnage at one time. Makers still ask up to $35, furnace, for average 20 per cent material, but no recent business has been done at higher than $32 and a firm bid of $30 hardly would go begging. Domestic ferromanganese now is quotable at $75 to $80, delivered, these prices representing a fair appraisal of to-day's' possibilities rather than sizable sales. Only carload lots are mov-

ing and even such sales are anything but numerous. English material still is held at $75 c.i.f. Atlantic seaboard, but this would mean a delivered price in this district above that of domestic material and, consequently, attracts no attention. The market for 50 per cent ferrosilicon is purely a buyers' affair. All makers are anxious for business and would go pretty low to secure an order. Canadian producers are said to have quoted under $70 delivered, in an effort to uncover a demand.

We quote 76 to 80 per cent ferromanganese at $75 to $80 delivered on domestic; English, 76 to 80 per cent, $75, c.i.f. Atlantic seaboard. We quote average 20 per cent spiegeleisen at $30 to $32 furnace quoted by makers on direct business and $28 to $30 furnace on resale tonnages; 50 per cent ferrosilicon, $70 to $75 furnace, freight allowed, for domestic and foreign material. Bessemer ferrosilicon is quoted f.o.b. Jackson County and New Straitsville, Ohio, furnaces, as follows: 9 per cent, $41.50; 10 per cent, $45; 11 per cent, $48.50; 12 per cent, $51.60. Silvery iron, 6 per cent, $32; 7 per cent, $33.50; 8 per cent, $35.50; 9 per cent, $37.50; 10 per cent, $40; 11 per cent, $43.30; 12 per cent, $46.60. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is $4.06 per gross ton.

Wire Rods.—Decline in prices of wire products has restricted an already small demand for rods, as the failure of the latter to drop with the finished products has encouraged some buyers to hold up shipping instructions against orders in. All makers are holding to $48, Pittsburgh, for the base size of soft rods, but the market looks top-heavy. Prices are given on page 1582.

Iron and Steel Bars.—Demand for mild steel bars still is entirely for small lots for prompt shipment and because of the character of the buying there have been no important deviations from the regular market price of 2.10c. base. Some makers, rather than go to the expense of starting up idle mills for brief periods, are turning down orders which they cannot supply from stock. Inquiries for reinforcing bars are fairly numerous although generally for small lots. Such bars, rolled from new billets are held at 2.10c. base, but prices as low as 1.80c., presumably against bars rolled from old rails, shell steel or billet crops, are reported. The contract for the Baldwin reservoir in Cleveland, which will take about 1700 tons of reinforcing bars, has been awarded a Cleveland contracting company, which has not yet placed the business. Iron bars still are slow of sale and attractive orders undoubtedly would develop lower prices.

We quote steel bars rolled from billets at 2.10c.; reinforcing bars, rolled from billets, 2.10c. base; reinforcing bars rolled from old rails, 1.90c. to 2c.; refined iron bars, 2.75c.; in carloads, f.o.b. mill, Pittsburgh.

Structural Material.—At least two good sized structural projects have been placed with fabricators in this district in the past week. The Jones & Laughlin Steel Co. has taken 1300 tons for a crusher plant for the Kelley Island Line & Transport Co., Marblehead, Ohio, and the Pittsburgh Des Moines Steel Co. has taken 1200 tons for a Navy Department aviation station, Ford Island, Hawaii. Other awards have been for small tonnages and although fairly numerous, do not reach any very large aggregate. Disputes between the contractors and building trades exist in practically all of the large cities in the country and Pittsburgh is no exception. The men are refusing to accept a cut in wages proposed in the new scale offered by contractors. An effort is being made in some centers to establish the open shop, but in this district the movement has been unsuccessful because of the failure of contractors to stand together. An award is expected soon of the 14 55,000-barrel tanks recently put up by the Shipping Board. Plain material is inactive and prices nominal. Prices given on page 1582.

Plates.—There is no change in the market as regards either the demand or prices. Inquiries run entirely to small tonnages for immediate shipment and on such business makers are not disposed to cut prices. Sizable tonnages, however, will undoubtedly develop lower prices. We quote sheared plates of tank quality, ¼-in. and heavier, at 2.20c., base Pittsburgh.

Steel Rails.—Very fair demand still is observed for light rails from the coal operators, but contractors and other users still are buying very sparingly. These rails rolled from new steel are generally held at 2.20c., Pittsburgh, but those rolled from old standard sections are offered at 2c. and on firm offers could be bought as low as 1.90c.

We quote 25 to 45-lb. sections, rolled from new steel, 2.20c.; rolled from old rails, 1.90c. to 2c.; standard rails, $45 mill for Bessemer, and $47 for open-hearth sections.

Hoops and Bands.—Business continues extremely slow, with buyers taking hold entirely in a hand to mouth way. Such business as is coming out is for immediate shipment and is being met largely from manufacturers' stocks. The price remains at 2.75c. base, but strict observance of this quotation is not claimed.

Cotton Ties.—Announcement of opening prices will be much later this year than usual, as makers seem inclined to wait until a demand appears before making a quotation. A good many ties were carried over from last year and early requirements will be supplied from these stocks.

Nuts, Bolts and Rivets.—There is no improvement in business, buyers still showing a tendency to confine purchases strictly to actual needs. Recent prices, however, are fairly well maintained because manufacturers are not trying to stimulate demand at the expense of profits. Rivets still are weak, however. Some makers who want orders have recently quoted as low as $3.10. Prices and discounts are given on page 1582.

Iron and Steel Pipe.—Purchases steadily are dwindling and while plant operations do not reflect this fact, this is because makers are producing for stock. Manufacturers are finding considerable competition in oil country pipe from offerings by speculators and also because several of the oil companies are offering their surplus stocks in the expectation of being able to replace them when needed at less than to-day's prices. Demand for merchant pipe is better than that for oil country goods but at that the jobbers are ordering cautiously. Open shading of prices is absent, but this must be ascribed chiefly to the belief held by manufacturers that price cuts at this time would not help business. Discounts are given on page 1582.

Steel Skelp.—Inquiries are few and for small lots, and few of such sales as are being made bring the full quotation of 2.20c., Pittsburgh. Makers here who have quoted that price invariably have lost the order.

Wire Products.—The recent reduction of $5 per ton in quotations by independents, which unofficially is being met by the American Steel & Wire Co., has failed utterly to stimulate the demand, which has been even lighter in the past week than it was previously. Indeed, some makers observe a tendency on the part of buyers to withhold shipping instructions against orders already in. Persistent reports of further reductions are making buyers extremely cautious.

We quote wire nails at $3 base per keg, Pittsburgh, and bright basic and Bessemer wire at $2.75 base per 100 lb. Pittsburgh.

Cold-Finished Steel Bars.—It is doubtful whether this branch of the industry ever before experienced a period when demands were so few and small. Consumers still have sizable stocks and are more interested at the moment in reducing, than in adding to, them. Most makers still ask 3.10c., base, but 3c. has been done and difficulty now is being experienced by makers to get more.

Hot-Rolled and Cold-Rolled Strips.—Reports about business vary somewhat, some noting a moderate increase in orders, while others still find interest on the part of consumers extremely small. One Pittsburgh district company has accumulated enough orders to run two mills this week, but it is noted that the company which secured much of the Ford business of a few weeks ago has its strip mills down this week. In general, there is room for considerable improvement in business. Prices are not very well defined. The stabilized bases were 2.75c. for hot-rolled and 5.50c. for cold-rolled, but these prices have been hard to obtain since the Ford Motor Co. was able to buy so much lower.

Spikes.—Fair demand is noted for small spikes in connection with coal mine development work, but sales are neither numerous nor large. Railroad spikes are dull and improvement is not expected until after the railroads have the advantage of lower wage costs and start laying rails. Large makers are quoting 3.40c.,

base, Pittsburgh, on all sizes, but on large spikes this price is being shaded by at least $3 per ton, and the Colorado Fuel & Iron Co., which is the low bidder against the 13,000 kegs asked for by the Southern Pacific Railroad, is said to have named a price of $3.50, f.o.b. Pueblo. Prices are given on page 1582.

Chain.—Effective June 1, leading makers revised downward on a number of kinds of chain. The new prices show reductions of 20c. to 40c. per pair on trace chains, with the extras for hooks, T hooks and T bars cut 2c. per pair from the old list, dated April 11, 1921, while the charge for galvanizing and for copper plating has been cut from 2c. to 8c. per pair. Stake chains have been lowered 25c. to 30c. per ft. Discounts have been increased (price lowered) 5 per cent on butt, stage, breast, with the exception of double and tapered, machine and coil chains and cow ties. Repair links and lap links and rings have been reduced in price 15 per cent. No. 25 steel dees now are quoted at list, against list plus 20 per cent in the April list.

Sheets.—It is impossible to chronicle any material betterment in business, although some fair-sized orders recently have been coming in from Japan. The past week has developed some deviation by independent makers from the stabilized prices of April 13. Business in blue annealed sheets has been booked as low as 2.90c., base, and sales of black sheets have been done as low as 3.85c., base, concessions from the regular market quotations of $4 and $3 per ton respectively. Prices are given on page 1582.

Tin Plate.—Makers of cans for the condensed milk trade are specifying fairly freely, but demands from other sources still are few and small. Production plate still is quoted at $6.25 per base box, Pittsburgh, and this is the base of shipments against contracts. New orders carrying that price, however, are few and small, as container manufacturers are meeting extra demands to a large extent from stock items, which are available anywhere from $5 to $5.75.

Coke and Coal.—The coke market has developed fresh weakness in the past week and $3.50 per net ton oven has given place to $3.25 as the maximum on standard furnace fuel, either for spot or future shipment. As a matter of fact, $3.25 has not found much basis in recent transactions, as the largest piece of business done was 9000 tons for June shipment to a merchant furnace which has about enough business to keep in blast this month, and the price was $3.15. At least one producer quoted $3 against this business, which was placed at a higher price to the producer already supplying this furnace. An Eastern steel company, which is piecing out its contract shipments by spot tonnages has been able lately to pick up choice brands of furnace coke at $3. The market is quotable from $3 to $3.25 per net ton oven. It develops that the Robesonia business was taken at around $3.60 per net ton, ovens, the contract to run to Oct. 1, and calling for 8000 tons a month. The Thomas Iron Co., Hokendauqua, Pa., has inquired for 4000 tons a month for last half shipment, the Colonial Iron Co., Riddlesburg, Pa., for 7000 tons a month and the Empire Steel & Iron Co., Catasauqua, Pa., for 500 tons a month. None of these inquiries has been closed, though as low as $3.25 has been quoted against them. Foundry coke also is weaker, in that $5 per net ton, ovens, now is the top quotation, while good brands can be bought at $4.50 to $4.75 and as low as $4 and $4.25 is heard of on unselected 72-hour fuel. Present furnace coke prices show producers a considerable loss, but coal is not in demand and there are some operators whose loss would be greater if they were to shut down. Lake shipments have not benefited the coal market, which still is in buyers' favor. Spot offerings of mine run steam coal still can be had at $1.75 to $2, while not much more is obtainable on by-product coal and while high grade gas coal is fetching as much as $2.50, the more common range is from $2 to $2.25.

Old Material.—Prices have weakened perceptibly since a week ago, due to a further falling away in the demand in keeping with steel works operations. Plants which are in operation appear to be congested and permits for shipments to them are being withheld. Shipping instructions are lacking to those plants which are down or nearly so. This condition has resulted in price cuts of from 50c. to $1 per ton in almost all grades. One steel maker here recently was offered 1000 tons of heavy melting steel at $13 delivered, but being filled up for the present turned down the offer. At that, the offerings of this and other grades are anything but heavy. Users of machine shop turnings have not been flooded with tonnages at the prices they are willing to pay. Steel makers here who made bids of around $13.50 for the couplers, knuckles and springs in the June list of the Pennsylvania Railroad, Eastern region, failed to secure any of the material offered. Max Solomon, this city, was the successful bidder for the 22,000 tons of shell forgings, bids for which were opened by the Ordnance Salvage Board in Washington yesterday. The price was $10.58 per gross ton, f.o.b. shipping point, which means from $16 to $16.50 delivered Pittsburgh district.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate, as follows:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh	$13.00 to $13.50
No. 1 cast cupola sizes	17.00 to 17.50
Rerolling rails, Newark and Cambridge, O.; Cumberland, Md.; Huntington, W. Va.; Franklin, Pa., and Pittsburgh	14.50 to 15.00
Compressed sheet steel	10.50 to 11.00
Bundled sheet sides and ends, f.o.b. consumers' mills, Pittsburgh dist.	8.50 to 9.00
Railroad knuckles and couplers	14.00 to 14.50
Railroad coil and leaf springs	14.00 to 14.50
Railroad grate bars	11.50 to 12.00
Low phosphorus melting stock, bloom and billet ends, heavy plates, ¼-in. and heavier	17.50 to 18.00
Railroad malleable	12.00 to 13.00
Iron car axles	21.00 to 22.00
Locomotive axles, steel	18.00 to 19.00
Steel car axles	15.00 to 15.50
Cast iron car wheels	14.50 to 15.00
Rolled steel wheels	14.00 to 14.50
Machine shop turnings	8.25 to 8.50
Sheet bar crop ends at origin	14.00 to 15.00
Heavy steel axle turnings	10.50 to 11.00
Short shoveling turnings	9.50 to 10.00
Heavy breakable cast	14.50 to 15.00
Stove plate	12.50 to 13.00
Cast iron borings	9.00 to 9.50
No. 1 railroad wrought	12.50 to 13.00

May Steel Ingot Output Still Low

The steel ingot statistics of the American Iron and Steel Institute for May show that 30 companies, which in 1920 produced 84.21 per cent of the total, had an output last month of 1,265,850 gross tons, as compared with 1,213,958 tons in April. The increase for May was 51,892 tons, or about 4.10 per cent. Estimating the production of the other companies on the basis of those reporting, the total production of ingots in May was 1,503,206 tons, or 57,815 tons per operating day, counting 26 working days to the month, against an estimated total of 1,441,537 tons or 55,443 tons per operating day in April. This is an increase of 61,669 tons or 2372 tons per day. In the table below the output of Bessemer and open-hearth works is separated and the data for 1920 by months are included:

Monthly Production of Steel Ingots by 30 Companies Which Produced About 84.21 Per Cent of Total in 1920—Gross Tons

	Open Hearth	Bessemer	All Other	Total
January, 1920	2,242,758	714,657	10,687	2,968,102
February	2,152,106	700,151	12,867	2,865,124
March	2,487,245	795,164	16,640	3,299,049
April	2,056,336	568,952	13,017	2,638,305
May	2,251,544	615,932	15,688	2,883,164
June	2,287,273	675,954	17,463	2,980,690
July	2,135,633	653,888	13,297	2,802,818
August	2,299,645	695,003	5,784	3,000,432
September	2,300,417	693,586	5,548	2,999,551
October	2,335,863	676,634	3,485	3,015,982
November	1,961,861	673,215	3,594	2,638,670
December	1,687,162	649,617	3,586	2,340,365
Total, 1920	26,197,843	8,112,753	121,656	34,432,252
January, 1921	1,591,281	608,276	3,629	2,203,186
February	1,295,863	450,818	2,796	1,749,477
March	1,175,591	392,983	2,404	1,570,978
April	1,000,053	211,755	2,150	1,213,958
May	1,047,810	216,497	1,543	1,265,850

The May ingot production was at the yearly rate of 17,980,465 tons, counting 311 operating days to the year. This compares with a rate in April of 17,242,773 tons, and with a rate of 21,258,405 tons in March. The increase of 61,669 tons in the estimated ingot output of all companies in May over that of April compares with an increase of 28,180 tons in the May pig iron output over that of April, as given on other pages of this issue.

Chicago

CHICAGO, June 7.

The dearth of business is forcing a steady reduction in production by both mills and furnaces. The Illinois Steel Co. continues to operate 10 out of 29 blast furnaces in this district and is rolling steel at about 31 per cent of normal while the Inland Steel Co. at Indiana Harbor has two out of three blast furnaces running and is making steel at the rate of 25 per cent of capacity. Its Chicago Heights mill, however, is idle, as is the Calumet Steel Co. plant at the same place. The bar iron mills of the Republic Iron & Steel Co. and the Interstate Iron & Steel Co. at Chicago are also inactive. At South Chicago, however, the latter company is operating its open hearths, its billet mill and its recently completed continuous merchant mill on a 30 per cent basis. The Wisconsin Steel Co. mills are on a 20 per cent basis and one of its three blast furnaces is blowing. With the going out of a Federal stack, the number of merchant blast furnaces operating in this district has been reduced to two, one being at Mayville and the other an Iroquois furnace at South Chicago. The latter of late, has been making Bessemer iron for the Markpipe plant.

The market is weak in practically all departments, but owing to the paucity of orders, price shading cannot be said to be general. Here and there concessions are being made, however, and in some cases on unimportant tonnages.

On two carloads of plates, less than 2c. was named, and in the Kansas City district 1.90c., Pittsburgh, has been done. In Indianapolis 500 tons of steel bars was sold at 2c., Pittsburgh, and in the Northwest bar business has been taken at 1.90c. and 1.875c., Pittsburgh. The general reduction of $5 a ton on wire and wire nails has not yet had any noticeable effect on business.

Jobbers serving the farmers are buying more freely than those dependent more largely on the manufacturing trade. This is particularly true in the Northwest, where the improved condition of the wheat market is having its effect. In fact, the large exports of wheat of late have aroused general interest. In some quarters hope is springing up for an earlier recovery of the agricultural implement industry than was heretofore thought possible.

Local steel producers are interested in an impending revision of transcontinental freight rates. The present rate on finished and semi-finished steel to the Pacific Coast is $1.50 and the transcontinental lines have tentatively reduced it to $1.05, which will apply from both Chicago and Atlantic tidewater points to the coast. This new rate has not yet been accepted by Eastern connecting lines and is not satisfactory to Western shippers, as the scheduled water rate from New York to the Coast is 75c., and considerably lower rates have been made on recent cargoes. Hearings are being held before the Transcontinental Freight Committee in this city this week, and it is possible that a further revision of all rail rates will be made.

Pig Iron.—A local furnace has sold 1000 tons of basic iron to a melter in the St. Louis district at $20 base, Chicago. This quotation is not regarded as truly representative of the ruling market here, because it was taken in competition with furnaces near the buyer's plant from which the freight on the iron would have been negligible. Current business in Chicago and vicinity has been light and largely confined to carload lots. A Michigan melter bought 500 tons of malleable for June shipment at $21.50, Chicago furnace, while a consumer in central Illinois purchased 300 tons of foundry for delivery within the next 45 days at $20 base, Chicago. Locally buying will probably be stimulated somewhat as a result of the settlement of the strike of union molders. The strikers asked for 90c. an hour, while the foundries offered 85c. and a compromise was reached on the basis of 77.5c. an hour or $7 a day. About 40 foundries are affected. The active Federal stack has been blown out with the result that only one merchant blast furnace, an Iroquois stack, remains in blast out of seven in this city. Local by-product foundry coke has been reduced 50c. a ton to $11.25 delivered in the Chicago switching district. Connellsville foundry coke is available at from $5 to $5.50 ovens, the freight to Chicago being $4.62. At least one maker of Southern foundry iron is now quoting $21 base Birmingham. One thousand tons of Southern resale, however, is being offered locally at considerably less than the delivered price of the furnace material.

The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable and steel-making irons, including low phosphorus, which are f.o.b. furnace and do not include a switching charge averaging 70c. per ton:

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$37.50
Northern coke, No. 1, sil. 2.25 to 2.75	$22.00 to 22.50
Northern coke foundry, No. 2, sil. 1.75 to 2.25	21.50 to 22.00
Northern high phos.	21.50 to 22.00
Southern foundry, sil. 1.75 to 2.25	27.67
Malleable, not over 2.25 sil	21.50 to 22.00
Basic	21.00 to 21.50
Low phos. Ohio furnace, sil. 1 to 2 per cent copper free	35.00
Low phos., f.o.b. Birmingham, sil. 1 to 2 per cent, copper free	31.00
Silvery, sil. 8 per cent	38.53

Ferroalloys.—Outside of an inquiry for 100 tons of spiegeleisen which has not yet resulted in an order, the market is without features.

We quote 78 to 82 per cent ferromanganese, $80 delivered; 50 per cent ferrosilicon, $80 delivered; spiegeleisen, 18 to 22 per cent, $37 to $38 delivered.

Plates.—The Great Northern Railroad has ordered 500 refrigerator cars from the General American Car Co. Not more than 1500 tons of steel will be needed in the construction of this equipment and the car builder has most of this material in stock. The Sinclair Refining Co. is asking for prices on the construction of four oil storage tanks of 55,000 barrels capacity each, for Tulsa, Okla. Only the tops of the tanks will be of steel, and they will require about 800 tons of light plates or heavy gage sheets. Demand for plates is unusually light, but such business as has been done has indicated the unsteady condition of the market. Two carloads, for example, were purchased for less than 2c., base Pittsburgh.

The mill quotation is 2c., Pittsburgh, the freight to Chicago being 38c. per 100 lb. Jobbers quote 3.23c. for plates out of stock.

Structural Material.—The situation remains substantially unchanged so far as fabricators are concerned. A fair number of small fabricating contracts have been awarded of late, but tonnage is far from the total necessary to put shops on a satisfactory footing. Locally the building trade lockout is still in effect and architects and contractors state that it is already too late in the year for new building projects to be undertaken even if an early settlement with the unions is reached. The largest fabricating prospect in the West is a Masonic Temple at Detroit which calls for about 7000 tons. Recent fabricating awards include:

Hangar at Pearl Harbor, Hawaiian Islands, 675 tons, to Pittsburgh-Des Moines Steel Co.

Curran Theater Building, San Francisco, 600 tons, to Judson Mfg. Co.

Loew Theater Building, San Francisco, 600 tons, to Judson Mfg. Co.

High school and junior college, Sacramento, Cal., 411 tons, to American Bridge Co.

Woodbury Junior High School, Denver, Colo., 323 tons, to Midwest Steel & Iron Works, Denver.

Swift & Co., coal pulverizing plant, Fort Worth, Tex., 235 tons, to Gage Structural Steel Co.

Two highway spans, Oroville, Wash., 153 tons, reinforced concrete substituted for fabricated steel.

Pending work includes:

World Theater Building, Omaha, Neb., 350 tons, bids taken last week.

Bascule bridge, Green Bay, Wis., 800 tons, plans to go out Aug. 1.

The mill quotation is 2.20c., Pittsburgh, which takes a freight rate of 38c. per 100 lb. for Chicago delivery. Jobbers quote 3.23c. for materials out of warehouse.

Rails and Track Supplies.—There is little demand for track accessories in this district, but it is apparent from purchases made in other sections that track bolts and spike prices are unsteady. Sales of spikes have been made at as low as 3.20c., Pittsburgh, while bolts have been sold at 4.20c., Pittsburgh. On the other hand, tie plates and angle bars appear to be firm. The Gary rail mill continues to operate at about 50 per cent of capacity.

Standard Bessemer rails, $45; open-hearth rails, $47; light rails rolled from new steel, 2.20c. f.o.b. makers' mills.

Standard railroad spikes, 3.20c. to 3.40c., Pittsburgh; track bolts with square nuts, 4.20c. to 4.35c., Pittsburgh; steel tie plates, 2.50c., and steel angle bars, 2.75c., Pittsburgh and Chicago; tie plates, iron, 2.50c. to 3c. f.o.b. makers' mills.

Bolts and Nuts.—The market is very quiet and while prices are not firm, the paucity of sales makes it difficult to ascertain the ruling level of quotations. Jobbers have practically no stocks, but are afraid to buy because they expect another general reduction in steel prices which they believe would be reflected in bolt and nut discounts. Rivets are weak. A Western railroad bought 20 tons of large structural rivets at less than $2.90, f.o.b. Pittsburgh, and as low as $2.75 is also reported to have been done. For mill prices, see finished iron and steel, f.o.b. Pittsburgh, page 1582.

Jobbers quote structural rivets, 4.53c.; boiler rivets, 4.63c.; machine bolts up to ⅞ x 4 in., 50 per cent off; larger sizes, 45 off; carriage bolts up to ⅞ x 6 in., 40 off; larger sizes, 40 off; hot pressed nuts, square and hexagon tapped, $2.10 off; blank nuts, $2.60 off; coach or lag screws, gimlet points, square heads, 50 and 5 per cent off. Quantity extras are unchanged.

Railroad Rolling Stock.—The Soo Line has awarded a contract to the American Car & Foundry Co. for the repair of 500 box cars. The Chilean State Railways are in the market for 30 Mikado type locomotives. The Mississippi Central has ordered three switch engines from the American Locomotive Co.

Bars.—The Indiana Highway Department will soon advertise for bids on 21 reinforced concrete bridges and 13 culverts and these are said to be forerunners of other projects which are expected to be undertaken during the course of the year. The department's program, if carried out, will result in the purchase of between one and two million dollars worth of steel alone. In this connection it is to be noted, however, that highway programs undertaken in other Western States have thus far resulted in a disappointingly small volume of business. In general, the demand for mild steel bars is exceedingly light, and while price shading continues to be reported, it has not been brought into prominence through the placing of orders involving tonnage of consequence. Lack of business has resulted in practically a suspension of bar iron production and the same can be said of rail carbon steel bars.

Mill prices are: Mild steel bars, 2.10c., Pittsburgh, taking a freight of 38c. per 100 lb.; common bar iron, 2.25c. to 2.38c., Chicago; rail carbon, 2c. to 2.25c., mill or Chicago.

Jobbers quote 3.13c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars is 4.63c. for rounds and 50c. extra for flats, squares and hexagons. Jobbers quote hard and medium deformed steel bars at 2.88c. base.

Cast Iron Pipe.—Akron, Ohio, has rejected all bids on 3.2 miles of 48-in. pipe, despite the fact the figures on both steel and cast-iron pipe are said to have been exceedingly attractive. Although the bids covered the laying of the pipe, it is estimated that the low figure on steel pipe was based on 1.50c. plates. Akron will readvertise. Other prospective business includes:

Marion, Ill., 600 tons, bids in June 13.
Erie, Ill., 250 tons, June 7.
Bellwood, Ill., amount not yet specified, June 15.
Minneapolis, 300 tons.

We quote per net ton f.o.b. Chicago, ex-war tax as follows: Water pipe, 4-in., $57.10; 6-in. and above, $54.10; class A and gas pipe, $3 extra.

Wire Products.—General reductions of $5 a ton in wire and wire nails have brought plain wire down to $2.75 per 100 lb. and wire nails to $3 per keg base, Pittsburgh. It is too early to appraise the effect of the cuts on business. While the jobbers are not yet showing an inclination to lay in stocks, it is notable that those serving the farm trade are buying more freely than those dependent more largely on the manufacturing trade. Local warehouse prices have also been reduced $5 a ton. For mill prices, see finished iron and steel, f.o.b. Pittsburgh, page 1582.

We quote warehouse prices, f.o.b. Chicago: No. 9 and heavier black annealed wire, $3.63 per hundred pounds; No. 9 and heavier bright basic wire, $3.78 per hundred pounds; common wire nails, $3.73 per hundred pounds; cement coated nails, $3.15 per keg.

Old Material.—Buying by users is light and the weakness of the market has been reflected in further declines in a number of items. It is probable that more general reductions would be made but for the fact that some classes of scrap are not being bought at all. Among the few sales to consumers we note one of 600 tons of No. 1 busheling at $9 per net ton and another of 300 tons of No. 1 wrought at $10.50 a net ton. Dealers who laid in scrap at higher prices than those now quoted are beginning to fear that they may have to liquidate at a decided loss. If freight rates on scrap should be reduced in the near future, their position would certainly not be strengthened. Railroad offerings include the Grand Trunk Western, 7400 tons; the Santa Fe, 1800 tons; the Missouri, Kansas & Texas, 1500 tons; the Great Northern, 2700 tons; the Michigan Central and the Lake Erie & Western, blank lists.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

	Per Gross Ton	
Iron rails	$16.50 to	$17.00
Relaying rails	30.00 to	35.00
Car wheels	13.50 to	14.00
Steel rails, rerolling	13.50 to	14.00
Steel rails, less than 3 ft.	13.00 to	13.50
Heavy melting steel	11.50 to	12.00
Frogs, switches and guards, cut apart	11.50 to	12.00
Shoveling steel	11.00 to	11.50
Low phos. heavy melting steel	14.00 to	14.50
Drop forge flashings	7.50 to	8.00
Hydraulic compressed sheet	7.50 to	8.00
Axle turnings	8.00 to	8.50
Per Net Ton		
Iron angles and splice bars	15.00 to	15.50
Steel angle bars	11.00 to	11.50
Iron arch bars and transoms	14.50 to	15.00
Iron car axles	20.00 to	20.50
Steel car axles	14.00 to	14.50
No. 1 busheling	9.00 to	9.50
No. 2 busheling	6.00 to	6.50
Cut forge	10.00 to	10.50
Pipes and flues	7.00 to	7.50
No. 1 railroad wrought	10.00 to	10.50
No. 2 railroad wrought	9.50 to	10.00
Steel knuckles and couplers	12.50 to	13.00
Coil springs	12.50 to	13.00
No. 1 machinery cast	13.00 to	13.50
Low phos. punchings	11.00 to	11.50
Locomotive tires, smooth	11.00 to	11.50
Machine shop turnings	3.50 to	4.00
Cast borings	5.00 to	5.50
Stove plate	12.50 to	13.00
Grate bars	10.50 to	11.00
Brake shoes	11.00 to	11.50
Railroad malleable	12.00 to	12.50
Agricultural malleable	12.00 to	12.50
Country mixed	8.00 to	8.50

New York

NEW YORK, June 7.

Pig Iron.—The pig iron market has descended to new depths of dullness. The New Jersey melter which was mentioned last week as being in the market for 1200 tons has withdrawn the inquiry and will buy from month to month to meet its requirements. This and other companies having on hand, or to be delivered, tonnages bought at much higher prices are buying moderate tonnages at present low prices in order to reduce their average price. The New Jersey inquiry brought out some low quotations, as for example, a Buffalo furnace quoted $22 furnace for iron analyzing 1.75 to 2.25 silicon. One company sold 500 tons Tuesday for prompt delivery. A few hundred tons of Pennsylvania iron has been sold at $25.50, furnace, for No. 2X. High phosphorus Luxemburg iron, averaging silicon 2.85 and phosphorus 1.90 is being offered for sale at $28.50 per gross ton c.i.f. Philadelphia.

We quote delivered in the New York district as follows, having added to furnace prices $2.52 freight from eastern Pennsylvania, $5.46 from Buffalo and $6.16 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	$28.52 to $29.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	27.52 to 28.52
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	26.52 to 27.52
Buffalo, sil. 1.75 to 2.25	32.46 to 33.46
No. 2 Virginia, sil. 1.75 to 2.25	31.16 to 32.16

Finished Iron and Steel.—The whole list of rolled steel products is decidedly weak and it is chiefly due to lack of attractive business that some prices have not been cut. The tendency to shade prices is more apparent on export inquiries than on domestic business, and the latter is confined to such small orders that the incentive to make concessions is lacking. Plates, shapes, bars and sheets are soft, while wire products have been reduced $5 a ton by the leading interest and independents. The fact that wire rods have not been reduced proportionately will probably work somewhat of a hardship to those companies which do not make their own steel. New prices on wire products are 3c. for nails, 2.75c. for bright and annealed wire and 3.85c. for barbed wire, all f.o.b. Pittsburgh. In plates 2c., Pittsburgh, is to-day's market on carload lots; 2.20c. on less than carloads, while an attractive specification of 100 tons or more would likely bring out quotations of 1.95c., Pittsburgh, or even lower. Evidence is lacking of shaded prices on structural shapes for domestic use, but on an inquiry for 1800 tons for a bridge in Japan

put out by Suzuki & Co., New York, bids of 2c., Pittsburgh, have been submitted. It is known that some fabricators who were recently awarded structural jobs are delaying the placing of the plain material, apparently expecting lower prices. An interesting variation in bids on reinforcing bars was noted at the opening by the United States Shipping Board on June 3, the inquiry calling for 410 tons for Norfolk, Va. The lowest bid was $31, f.o.b. Marietta, Pa., but this was for rusted material. On rail carbon bars a company at Franklin, Pa., put in a bid of $37 per net ton, f.o.b. mill. A Perth Amboy company quoted $43.20, mill, and another bid on mild steel was 2c., Rockaway, N. J., mill. Another bid of 2c., mill, was put in by a Columbia, Pa., company, but the material offered was to be re-rolled from soft steel scrap. Other bids were 1.99c., Pittsburgh; 2.54c., delivered Norfolk, and the larger independent mills quoted 2.10c., Pittsburgh. In structural material there is a pronounced tendency to postpone work that has been estimated upon by fabricators. Conspicuous among the projects which have been indefinitely deferred are the Chesapeake & Ohio Railroad bridge, 1500 tons; tanks for the United States Shipping Board; 900 tons for the Pennsylvania Sugar Co., Philadelphia; 1200 tons for the Chamber of Commerce, Newark, N. J.; 300 tons for the National Folding Box Co., New Haven, Conn. Bids close this week on 1500 tons for a bank at Fort Wayne, Ind., and 400 tons for a chemical laboratory at Cornell University. The Bethlehem Fabricators, Inc., was awarded 450 tons for the State of New Jersey Hospital at Morris Plains and 600 tons for the Great Northern Paper Co., Millinocket, Me., is reported to have been placed. The Pittsburgh & West Virginia Railroad is expected to place orders this week for the repair of 500 steel hopper cars, 250 of which are to have new steel bodies. If the deal can be financed the Mexican Government may purchase 100 locomotives. It is expected the business will be equally divided between the American Locomotive Co. and Baldwin Locomotive Works. A Mexican commission is here now trying to arrange the transaction.

We quote for mill shipments, New York, as follows: Soft steel bars, 2.48c.; plates, 2.38c. to 2.58c.; structural shapes, 2.58c.; bar iron, 2.28c.

Ferroalloys. — There continues to be almost no demand for ferromanganese or spiegeleisen and quotations are nominally unchanged. While it is thought that these could be shaded there has been no test of the market. Demand for spiegeleisen is confined to a few inquiries for carload lots. At last the production of both alloys has fallen to totals which are now in keeping with the present condition of the steel industry. As indicated in the blast furnace reports on other pages the ferromanganese output for May was only 6853 tons as compared with 9566 tons in April, and an average of 19,178 tons per month the first quarter of this year. The spiegeleisen output was only 2379 tons, as compared with 14,744 tons in April and 11,666 tons in the first quarter of this year. The manganese ore market is inactive and nominal. The 50 per cent ferrosilicon market is also inactive with quotations nominal.

Ferromanganese, domestic, delivered, per ton	$80.00
Ferromanganese, British, seaboard, per ton	$75.00
Spiegeleisen, 20 per cent, furnace, per ton,	$30.00 to $32.00
Ferrosilicon, 50 per cent, delivered, per ton	$80.00
Ferrotungsten, per lb. of contained metal	48c. to 58c.
Ferrochromium, 6 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr	16c. to 16.50c.
Manganese ore, foreign, per unit, seaboard	22.50c.

Warehouse Business.—Slackness continues with prices largely nominal among dealers heavily stocked. A large mill interest is reported to have unofficially offered wire nails, per keg, at a considerable concession to customers, which is viewed in some quarters as the forerunner of an official reduction on other wire products. Prices show no change and business is unimproved. We quote prices on page 1594.

High Speed Steel.—The market remains sluggish, although some producers report a slight improvement in sales to manufacturers of textile machinery and similar lines. A mill manufacturing corrugated bars and other products recently purchased what is at present a heavy order, about 5000 lb. We quote 18 per cent tungsten high speed steel at 90c. to $1 per lb.

Cast Iron Pipe.—Reductions of $5 in price have been made in the base size, 6 in., and of $10 in the smaller sizes. The largest municipal inquiry is that of the city of Norfolk, Va., for a large tonnage of 30-in. flexible joint pipe, bids to be opened June 9. Pipe manufacturers are probably busier than makers of any other iron and steel commodities. The new prices, f.o.b. New York, for carload lots follow: 6-in. and larger, $53.30; 4-in. and 5-in., $58.30; 3-in., $68.30, with $4 additional for Class A and gas pipe.

Coke.—Some merchants report more satisfactory sales in foundry coke than in pig iron. The price centers around $5, Connellsville, for guaranteed coke, though unguaranteed coke is obtainable at $4.50. One maker of by-product coke in this district still adheres to the $5.50, Connellsville, price. New England ovens are attempting to secure contract business for future delivery though the response is not active.

Old Material.—Prices are stable for the simple reason that there is little business. An eastern Pennsylvania heavy melting steel consumer which offered $12.50, delivered, a short time ago, now offers only $12. There is a slight demand for stove plate and pipe. The fair demand for cast a week ago has subsided. Dealers are watching with interest the agitation for a reduction of freight rates, which would allow them to make more long distance shipments with profit.

Buying prices per gross ton, New York, follow:

Heavy melting steel	$7.00 to $7.50
Rerolling rails	9.50 to 10.00
Relaying rails, nominal	40.00 to 42.50
Steel car axles	10.50 to 11.00
Iron car axles	17.00 to 18.00
No. 1 railroad wrought	10.00 to 11.00
Wrought iron track	7.25 to 7.50
Forge fire	5.00 to 5.50
No. 1 yard wrought, long	8.50 to 9.00
Light iron	2.00 to 3.00
Cast borings (clean)	4.00 to 4.50
Machine-shop turnings	3.00 to 4.00
Mixed borings and turnings	3.00 to 3.50
Iron and steel pipe (1 in. diam., not under 2 ft. long)	8.00 to 8.50
Stove plate	9.00 to 9.50
Locomotive grate bars	8.50 to 9.00
Malleable cast (railroad)	8.00 to 8.50
Old car wheels	13.00 to 13.50

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	$16.00 to $17.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	15.00 to 16.00
No. 1 heavy cast, not cupola size	10.00 to 11.00
No. 2 cast (radiators, cast boilers, etc.)	10.00 to 11.00

Cincinnati

CINCINNATI, June 7.

Pig Iron.—A Kentucky melter is in the market for 500 tons of Southern iron and 250 tons of either Northern or Virginia iron for June shipment. The National Cash Register Co., Dayton, Ohio, has sent out an inquiry for 320 tons half Northern and half Southern and a central Ohio melter inquired for 500 tons of malleable but almost immediately withdrew the inquiry. With these exceptions the market is very quiet, the largest sale reported in this territory being one of 200 tons of Northern iron to an Indiana melter. The American Radiator Co. is reported to have closed for 300 tons of Southern iron for its Birmingham plant. Prices are inclined to weakness and a sale of 100 tons of Southern iron was made during the week at $21.75, Birmingham. Carload sales of Southern iron, however, are still being made at $22.50 to $23, but it is said that on a round tonnage $21 could be done. Some southern Ohio high silicon iron was sold last week on the basis of $23, Ironton, but sales are still being made at $24. There is no activity in either silvery or basic.

Based on freight rates of $4.50 from Birmingham and $2.52 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$26.50
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	27.50
Ohio silvery, 8 per cent sil	38.02
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	25.52
Basic, Northern	25.52
Malleable	26.52

Finished Material.—Rumors of lower prices continue to be heard on all lines of finished products.

This is particularly so in the case of black and galvanized sheets and on an inquiry of five or six carloads for a West Virginia manufacturer it is reported that quotations ranging from $4 to $6 a ton below the stabilized prices were made. So far as can be learned, this business has not been placed. A sale of 530 tons of reinforcing bars was made to a local contractor during the week. The price has not been announced, but on the straight bars it is said that 2.32½c. delivered Cincinnati, took the business and on bent bars 2.40c. delivered. Some readjustment in wire prices has been made by one of the leading companies, to meet prices quoted by some of the smaller mills, and it is reported that the Steel Corporation subsidiary is also inclined to meet the present market. Some inquiries are being received for bale ties, wire fence and wire nails. Some plate business was also placed during the week and several carload lots of structural material were booked at the stabilized price. Some interest was also shown in steel pipe, several users placing fair sized orders. In the structural field, no projects of any size are up for bids. It is expected that bids will be asked on June 15 for the construction of the stadium at Ohio State University. This will take approximately 3500 tons of reinforcing bars and about 750 tons of structural steel. Several high school buildings in this section of the State will also shortly be up for bids. Plant operations will not change materially during the week, the mills in this territory running approximately 40 to 50 per cent, which is slightly above the general average of the independents.

Warehouse Business.—Business continues light and small orders for immediate shipment are about the only activity. No price changes are reported and none is anticipated for some time.

Iron and steel bars, 3.35c. base; hoops and bands, 4.05c. base; shapes, 3.45c. base; plates, 3.45c. base; reinforcing bars, 3.42½c. base; cold rolled rounds, 1½ in. and larger, 4.85c.; under 1½ in. and flats, squares and hexagons, 5.35c.; No. 10 blue annealed sheets, 4.35c.; No. 28 black sheets, 5.50c.; No. 28 galvanized sheets, 6.50c.; wire nails, $3.60 per keg base; No. 9 annealed wire, $3.60 per 100 lb.

Coke.—The coke market is unusually quiet, only an occasional carload sale being reported. Prices are, if anything, a little softer. It is reported that additional ovens in the West Virginia field will go out shortly owing to lack of orders.

Old Material.—There is no activity in the scrap market and some dealers state that the present stagnation is unprecedented. Prices quoted in the absence of transactions can be regarded only as nominal.

We quote dealers' buying prices:

Per Gross Ton

Bundled sheets	$7.50 to $8.50
Iron rails	16.50 to 17.50
Relaying rails, 50 lb. and up	30.50 to 31.50
Rerolling steel rails	11.50 to 12.50
Heavy melting steel	10.00 to 11.00
Steel rails for melting	10.50 to 11.50
Car wheels	14.00 to 15.00

Per Net Ton

No. 1 railroad wrought	10.00 to 11.00
Cast borings	5.00 to 5.50
Steel turnings	3.50 to 4.00
Railroad cast	13.50 to 14.50
No. 1 machinery	13.50 to 14.50
Burnt scrap	8.00 to 9.00
Iron axles	20.00 to 20.50
Locomotive tires (smooth inside)	10.00 to 11.00
Pipes and flues	7.50 to 8.00

Youngstown Companies Reduce Salaries

YOUNGSTOWN, OHIO, June 7.—Incoming business of the Youngstown Sheet & Tube Co. averages between 15 and 20 per cent, the lowest rate in years, state officials. New business with other Valley independents is at the same rate or less. Independents are reducing salaries of officials from 15 to 30 per cent in efforts to lower costs. Effective June 16 the Brier Hill Steel Co. will cut officials' salaries 15 per cent.

"We are losing money on operations and are continuing our efforts to spare operating and overhead costs," states President James A. Campbell of the Sheet & Tube company. "There will be no bonuses for officials and salaries must likewise be reduced."

Cleveland

CLEVELAND, June 7.

Iron Ore.—It is expected that ore prices for the season will be established within a week. The first actual sale for 1921 has been made, this being included in a new long time contract which specifies that whatever shipments may be made this season shall be at the going market price and other inquiries have come out for approximately 100,000 tons of ore, including one lot of 65,000 tons. In addition to these inquiries, another factor that will doubtless lead to the naming of prices without further delay is that some consumers who are taking ore on long time contracts are getting anxious to have prices fixed so that they will know what the ore they are taking is going to cost them. Some buying will follow the establishment of prices, but sales will be very light. Ore shipments during May were only 2,594,027 gross tons, or the smallest movement in May since 1908. During May last year shipments were 6,976,085 tons. Shipments for the season to June 1 were 2,770,238 tons. Shipments are not increasing. However, the June movement will show a gain over May, as very little ore was moved before the middle of May.

We quote delivered lower lake ports: Old range Bessemer, $7.45; old range non-Bessemer, $6.70; Mesabi Bessemer, $7.20; Mesabi non-Bessemer, $6.55.

Pig Iron.—The market is dull and weak. Foundry iron prices have declined at least 50c. per ton to $22.50 for No. 2, at which some small lot sales have been made and there are reports of quotations as low as $22. However, a few furnaces are still asking $23. Some of the low prices are coming from other than Lake furnaces. A Barberton, Ohio, consumer has placed 500 tons of foundry iron and neither this iron nor 350 tons recently inquired for by the American Radiator Co. for its Springfield, Ohio, plant went to a Cleveland furnace. The radiator company which recently inquired for 200 tons for its Titusville plant has sent out another inquiry for the same amount for that plant. The Standard Sanitary Mfg. Co. has inquired for 500 tons of Southern foundry iron for its Louisville plant for June shipment, and it is expected to come into the market in a day or two for a good sized lot of Northern iron for June shipment. The American Car & Foundry Co. has inquired for 100 tons of foundry iron for its Berwin, Pa., plant. Two or three inquiries have come from the East for 300 to 400 ton lots. One local interest reports sales of only 600 tons during the week. Car lot sales of low phosphorous iron are reported at $39 and $40 and a Pittsburgh consumer is inquiring for 500 tons of this iron. Many of the small lot foundry iron sales are being made to consumers that are buying low priced iron to average down prices on their high priced contracts. The falling off in the automobile business has resulted in cutting down shipments of foundry iron. On the other hand, one jobbing foundry which has not taken any iron this year has released over 500 tons for June shipment.

Basic	$23.46
Northern No. 2 fdy., sil. 1.75 to 2.25	24.50
Southern fdy., sil. 2.25 to 2.75	29.92
Ohio silvery, sil. 8 per cent	38.86
Standard low phos., Valley furnace	$39.00 to 40.00

Finished Iron and Steel.—The volume of business has fallen off and orders are extremely light. There are further reports of price shading on steel bars, plates and structural material, but most mills are adhering to regular prices. Virtually no business is coming from the automobile industry. Mills and parts manufacturers are awaiting an announcement from the Ford Motor Co. as to its plans for July production. This company has been placing orders early in the month for its requirements for the following month, but has as yet sent out no requirements for July. There has been a curtailment of operations in plants making alloy steels for the automobile trade. The building strike in Cleveland, after lasting five weeks, has been settled by an arbitration agreement and this is expected to result in more activity in the building field. The Jones & Laughlin Steel Co. has taken 1406 tons of structural material for a crusher plant for

the Kelly Island Lime & Transportation Co. at approximately $85 per ton fabricated and erected, which is regarded as a very low price. As low as $64 was bid on this building fabricated but not erected. Bids for the Ohio State University stadium will be taken June 15. This will require 2000 tons of reinforcing bars in addition to 2500 tons of structural material. A new low price of 1.85c. on hard steel reinforcing bars has been made on a Government inquiry for 400 tons for work at Norfolk, Va. The usual quotation is 1.90c. Following a reduction to 2.75c. on plain wire, a concession to 2.90c. is reported to have been made on nails by one small mill. The Cleveland Railway Co. has placed 500 tons of standard rails with the Lackawanna Steel Co.

Cleveland warehouses quote steel bars and small shapes at 2.99c.; plates, 3.09c.; structural shapes, 3.09c.; No. 9 galvanized wire, 4.45c.; No. 9 annealed wire, 3.75c.; No. 28 black sheets, 4.80c.; No. 28 galvanized, 5.70c.; No. 10 blue annealed, 3.85c. to 4c.; hoops and bands, 3.69c.; shafting, 4.25c.

Sheets.—The demand for sheets is quieter than it has been. A little price shading is reported on all grades. However, most mills are adhering to regular quotations.

Track Supplies.—Sharp cuts in prices on spikes and track bolts have been made in this territory and are attributed to a Chicago mill. Quotations of around 3c. to 3.10c., Pittsburgh, were reported on spikes and 3.62c. on track bolts.

Coke.—Foundry coke prices have declined about 25c. a ton. Some carlot sales are being made at $5 to $5.50 for standard Connellsville brands.

Bolts, Nuts and Rivets.—The demand for bolts and nuts is still very light and a number of manufacturers are operating their plants at only 25 to 30 per cent of capacity. Small orders are being booked at regular prices, but makers admit that a good inquiry would probably bring out concessions. The inquiry for 1,036,000 1⅞-in., 3½ per cent nickel steel bolts, amounting to several thousand tons, for the New York vehicular tunnel has been held up temporarily. The rivet market is very dull and prices are irregular with a spread of at least $2 a tone in quotations.

Old Material.—The scrap market is almost at a standstill. The only activity is in a limited amount of trading between dealers, and consumers' prices are to a large extent nominal. One Cleveland mill has shut off shipments of heavy melting steel scrap, but another consumer is still taking borings and turnings. Small lot purchases by dealers are reported at $7.50 to $8 for mixed borings and $11 for heavy melting steel. Quotations are unchanged.

We quote per gross ton delivered consumers' yards in Cleveland and vicinity as follows:

Heavy melting steel	$11.50 to $12.00
Steel rails under 3 ft.	13.50 to 14.00
Steel rails, rerolling	15.00 to 16.00
Iron rails	13.00 to 14.00
Iron car axles	20.00 to 21.00
Low phosphorus melting scrap	14.00 to 15.00
Cast borings	8.00 to 8.25
Machine shop turnings	6.50 to 7.00
Mixed borings and short turnings	8.00 to 8.25
Compressed steel	10.00 to 10.50
Railroad wrought	12.00 to 13.00
Railroad malleable	13.00 to 14.00
Light bundled sheet stampings	5.00 to 6.00
Steel axle turnings	10.00 to 10.50
No. 1 cast	17.00 to 17.50
No. 1 busheling	7.50 to 8.00
Drop forge flashings, over 10 in.	5.50 to 6.00
Drop forge flashings, under 10 in.	6.00 to 6.50
Railroad grate bars	13.50 to 14.00
Stove plate	13.50 to 14.00
Pipes and flues	7.00 to 8.00

High Cost of Shipping Ore

CLEVELAND, June 7.—Ore consumers have presented to shippers interesting figures showing transportation costs, using these as a reason for holding up shipments of ore contracts this season. The total cost of transporting ore from the mines to a Valley furnace at present is $3.13 per ton including war tax. They have estimated a possible reduction of 64c. per ton in transportation and handling including a 30c. reduction from the mines to upper lake docks and adding to this 22c. interest on the transportation charge for a year and 10c. for additional State tax on ore carried at Lake Erie docks or furnace yards as compared with the tax if the ore is left in the mines, makes a total of 96c. a ton higher cost for moving ore this year as compared with their estimates for next year. This figure does not take into consideration increase in inventory, possible lower labor costs next year for unloading and lower royalties next year should the 1922 ore prices be lower than this year's prices. Ore shippers are using the same figures as an argument for the immediate reduction of transportation costs.

Boston

BOSTON, June 7.

Pig Iron.—Little business was transacted the past week. One house reports a sale of 200 tons eastern Pennsylvania No. 1 X at about $31, delivered to an eastern Massachusetts foundry, which figures out about $24.50 furnace for silicon 1.75 to 2.25. Another house reports other sales of silicon 2.25 to 2.75 in car lots, totaling 175 tons, at $26 furnace and 100 tons No. 2 X Virginia at $27, furnace. Otherwise little has been done. The undertone of the market for Virginia irons appears firmer due to a lack of resale lots offered. An eastern Pennsylvania furnace previously on a basis of $28, $29.25 and $31 for No. 2 plain, No. 2 X and No. 1 X, now quotes $27, $28 and $29, respectively, but it is still out of line with most furnaces. Buffalo iron is an indefinite factor in this territory. What could be done on sizable orders is problematical. It now develops that some sales of eastern Pennsylvania iron reported recently represented readjustments on contracts. Delivered pig iron prices follow:

East. Penn., silicon 2.25 to 2.75	$28.56 to $29.56
East. Penn., silicon 1.75 to 2.25	27.56 to 28.56
Buffalo, silicon 2.25 to 2.75	30.46 to 32.46
Buffalo, silicon 1.75 to 2.25	29.46 to 31.46
Virginia, silicon 2.25 to 2.75	33.58 to 35.83
Virginia, silicon 1.75 to 2.25	32.58 to 33.58
Alabama, silicon 2.25 to 2.75	33.66 to 34.16
Alabama, silicon 1.75 to 2.25	33.16 to 33.66

Finished Materials.—Slightly more figuring on structural steel tonnages, but no increase in actual tonnages booked is reported. Reinforcing bars market is more active than others, yet aggregate tonnage involved does not exceed 1000 tons. Small mills have quoted as low as 1.75c. f.o.b. Pittsburgh on a 125-ton lot and 1.90c. on similar tonnages, while important interests hold to 2.10c. Mill representatives report the market for finished materials in general was less active the past week than for any similar period this year. Buyers are still dickering on rail and plate tonnages reported last week.

Warehouse Business.—Movement of iron and steel out of stock continues as heretofore and at unchanged prices. Bolts and nuts are perhaps a shade more active, but business is spotty. Wire nails have been cut from 4.35c. to 4.10c. per keg base, and there has been a further readjustment in cut nails from $6.75 to $5 per keg base from store. Barbed wire is 25c. per 100 lb. cheaper.

Jobbers now quote: Soft steel bars, $3.18 per 100 lb. base; flats, $4.18 to $4.28; concrete bars, $3.18 to $3.45½; tire steel, $4.25 to $4.75; spring steel, open hearth, $5.50; crucible, $11.50; steel bands, $3.83 to $4.48; steel hoops, $4.38; toe calk steel, $5.25; cold rolled steel, $4.65 to $5.15; structural, $3.18 to $3.28; plates, $3.28 to $3.50; No. 10 blue annealed sheets, $4.53; No. 28 black sheets, $5.85; No. 28 galvanized sheets, $6.85; refined iron, $3.18 to $5; best refined, $5; Wayne iron, $8.50; Norway iron, round, ¼-in. to 2½-in., 8c. per lb. net; other sizes, 10c. base.

Coke.—The New England Coal & Coke Co. and the Providence Gas Co. have announced June foundry coke prices. Spot fuel is now $11.41 delivered where the local freight does not exceed $3.40, and contract coke $11.16 delivered. These prices are practically on a $5.25 and $5 respectively, f.o.b. Connellsville oven base. Both companies report a considerable increase in releases on contracts with little improvement in new business. Connellsville foundry cokes are offered at $5 per ton and occasionally at 25c. per ton less. Only scattering car lots have been taken.

Old Material.—Some dealers quote No. 1 machinery cast at slightly higher prices due to car lot sales of selected textile machinery at $19 delivered and slightly higher. A majority, however, have not been able to secure more than $18 delivered for what little they have sold since last reports. A Massachusetts railroad equipment manufacturer has purchased about eight

cars stove plate at $15.50 and $16 delivered. Quotations on railroad malleable have fallen below those of stove plate in the absence of inquiries. A Maine melter paid $9 delivered for a car of cotton ties, and a New England horseshoe maker $16 delivered for 100 tons of strictly No. 1 railroad wrought, while a dealer has taken on a limited tonnage of wrought pipe at $7.50 on cars shipping point.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$18.00 to $19.00
No. 2 machinery cast	16.00 to 17.00
Stove plate	15.00 to 15.50
Railroad malleable	14.50 to 15.00

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$7.00 to $7.50
No. 1 railroad wrought	10.00 to 11.00
No. 1 yard wrought	9.00 to 9.50
Wrought pipe (1-in. in diam., over 2 ft. long)	7.00 to 7.50
Machine shop turnings	3.00
Cast iron borings, rolling mill	3.00 to 4.00
Cast iron borings, chemical	3.00 to 4.00
Blast furnace borings and turnings	3.00
Forged scrap and bundled skeleton	4.00 to 5.00
Street car axles and shafting	12.00 to 13.00
Car wheels	12.00 to 12.50
Rerolling rails	9.00 to 9.50

Buffalo

BUFFALO, June 7.

Pig Iron.—Approximately 2000 tons was sold last week by Buffalo furnaces through their several offices at the $24 and $25 base prices, but on the whole business is quieter. Improvement hoped for by several furnace interests has failed to materialize. Sales are mostly for carload lots. One furnace has sold practically all its iron in stock and as its furnace has been down for weeks, it is completely withdrawn as a factor in this district. The trend of business is indicated in the inquiry reported by one producer; an aggregate of 4000 tons in 20 separate inquiries.

We quote f.o.b. dealers' asking prices per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil.	$26.00 to $27.00
No. 2X foundry, 2.25 to 2.75 sil.	25.00 to 26.00
No. 2 plain, 1.75 to 2.25 sil.	24.00 to 25.00
Basic (nominal)	23.00 to 24.00
Malleable nominal	24.00 to 25.00
Lake Superior charcoal	38.00

Finished Iron and Steel.—Continued dullness marks this market. Business is no better with any company and worse with several. With one producer operation is on the same scale as for the last two months. The only mill which has improved its schedule is now working about 50 per cent of normal in all departments except rails. Sufficient orders are on hand or in sight to continue this capacity for some time. Bars are more in demand than any other material with this mill. A number of reinforcing bar inquiries were received by local mills, but none of the orders was placed here. One mill refused to quote knowing its price was prohibitive. Demand is good for wire cloth and netting with one maker and fabric used in road construction is also active. This mill has sufficient orders on hand to continue its present schedule for the summer. The Kellogg Structural Steel Co. will fabricate 150 tons for St. Peter and Paul's school, Buffalo, and 100 tons for the Alberger Pump Co., Newburgh, N. Y. Small mills are shading pipe prices but no tonnage has been brought out as a result.

We quote warehouse prices f.o.b. Buffalo as follows: Structural shapes, 3.25c.; plates, 3.25c.; plates, No. 8 gage, 4.10c.; soft steel bars and shapes, 3.15c.; hoops, 3.85c.; blue annealed sheets, No. 10 gage, 4.15c.; galvanized steel sheets, No. 28 gage, 6.30c.; black sheets, No. 28 gage, 5.30c.; No. 9 gage annealed wire, 4.35c.; cold rolled strip steel, 8.15c.

Warehouse Business.—Prices on bolts, nuts, wire nails and rivets have been reduced by one warehouse interest and aggregate about 10 per cent all along the line. Better business in structural material to be used in bridge construction is seen as a number of public improvements along the highways are started. No change has been made on the so called major lines such as sheets, bars and plates. The volume of business continues even and has not changed perceptibly in six weeks. Reinforcing bar business has improved slightly with the advent of public improvements.

Old Material.—Dealers say the market is less active than at any time since the depression set in. All sales are for trivial tonnages. The activity in heavy melting steel which occupied a number of dealers has quieted and apparently the entire order placed by a railroad equipment maker has been filled. Prospective business indicates a quiet summer period.

We quote dealers' asking prices per gross ton, f.o.b. Buffalo, as follows:

Heavy melting steel	$12.50 to $13.00
Hydraulic compressed	9.00 to 9.50
Low phos., 0.04 and under	17.00 to 18.00
No. 1 railroad wrought	13.00 to 14.00
Car wheels	16.00 to 17.00
Railroad malleable	11.50 to 12.50
Machine shop turnings	7.00 to 8.00
Heavy axle turnings	10.00 to 11.00
Clean cast borings	7.00 to 8.00
Locomotive grate bars	11.50 to 12.50
Wrought pipe	9.50 to 10.50
No. 1 busheling	9.50 to 10.50
Stove plate	15.00 to 16.00
Bundled sheet stampings	7.00 to 8.00
No. 1 machinery cast	18.00 to 18.50

Birmingham

BIRMINGHAM, ALA., June 7.

Pig Iron.—The largest transaction of the week was 25,000 tons to the National Cast Iron Pipe Co. reported to have gone at a very low price. A sale of 800 tons for the Pacific Coast was made. Special shipping arrangements in vessels out of a gulf port are understood to have helped this sale. Several lots of 100 tons were sold for Western delivery and numerous car lots. Many new customers appeared in the market for rush car loads. Inquiry is brisker. Stocks are running low all over the South and Southwest. No large deals are reported. The high price now is $22.50 with any tonnage around 200 and up selling at $22. Average silicon differentials are not over $1.

We quote per gross ton f.o.b. Birmingham district furnace, as follows:

Foundry, sil. 1.75 to 2.25	$22.00
Basic	21.00
Charcoal	35.00

Plant Operations.—Several iron consumers in the Birmingham district report greater operations. Radiator works are reported at normal and one large maker of sugar refinery castings is also at normal. Shipments have been good. One interest more than moved its one-furnace make. Another has reduced stocks by 8000 tons. This week witnesses the beginning of regular operations of the pressed steel car plant of the Chickasaw Shipbuilding & Car Co. with capacity of 15 to 25 standard freight cars per diem and orders for 1000 cars on hand. Ingot production of the Tennessee company is at 50 per cent with the rail mill on a continuing normal base. Japan is taking 4500 tons of rails. The Gulf States Steel Co. is running in all departments at 50 per cent capacity.

Coal and Coke.—Numerous reductions in wages have been made at coal mines at request of miners who appealed to operators to get business at reduced prices from competitors. Union as well as non-union mines have done this.

Old Material.—The scrap market still fails to show signs of revival, although No. 1 heavy steel is seemingly in better demand. Transactions are light.

We quote per gross ton f.o.b. Birmingham district yard as follows:

Old steel rails	$10.00 to $11.00
No. 1 steel	9.00 to 10.00
No. 1 cast	16.00 to 17.00
Car wheels	16.00 to 17.00
Tramcar wheels	15.00 to 16.00
No. 1 wrought	13.00 to 14.00
Stove plate	9.00 to 10.00
Cast iron borings	6.00 to 7.00
Machine shop turnings	6.00 to 7.00

A manufacturers' power conference has been called by the Water Power League to meet at the Waldorf-Astoria, New York, June 21 and 22, to discuss the development of power for manufacturing and other purposes. Featured discussions will consider the Federal power act and the super power zone plan.

Philadelphia

PHILADELPHIA, June 7.

Steel companies admit that prices are soft, though denying that any great amount of cutting has yet been done except on plates, the price of which is now regarded as 2c., Pittsburgh, with the probability that lower quotations would be made on any desirable tonnage. There seems no longer to be any question that the prices uniformly adopted several weeks ago by the Steel Corporation and the independent companies have been abandoned in spirit, at least, and the fact that few low prices have actually been quoted has been due principally to lack of desirable specifications.

The steel trade has done very little business in the past two weeks. Demand is at the lowest point since the present depression set in. This situation also applies to pig iron.

Pig Iron.—Following a sale of 300 tons of No. 2 plain iron to a radiator plant at Trenton, N. J., at $23, furnace, an Eastern producer of pig iron decided to advance its price to $24, base, with $25 for No. 2 X and $26 for No. 1 X. Other Eastern producers intimate that they also will adhere to these prices, which constitute an advance of $1 on No. 2 plain from the low point, 50c. to $1 on No. 2 X and about the same amounts on No. 1 X. These low prices have been made only on the most desirable tonnages, carload lots being quoted about $1 a ton above the minimum levels. The demand for iron shows no improvement; in fact, in the past week or two there has been a falling off in the demand. No sales are reported as yet on the new price basis, and in view of this we continue our quotations as of last week.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia, and include freight rates varying from 84 cents to $1.54 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25	$24.75 to $25.25
East. Pa. No. 2X, 2.25 to 2.75 sil.	25.50 to 26.25
Virginia No. 2 plain, 1.75 to 2.25 sil.	31.74
Virginia No. 2X, 2.25 to 2.75 sil.	32.99
Basic deliv. Eastern Pa.	25.00
Gray forge	25.26
Standard low phos. (f.o.b. furnace)	38.00
Malleable	28.00 to 29.00
Copper bearing low phos. (f.o.b. furnace)	35.00

Semi-Finished Steel.—Reports of sales of German sheet bars in this country are not confirmed. It has been stated that one lot was sold at $34, delivered New York. The demand for billets is negligible. Price quotations are unchanged, $37 for rerolling quality and $42 for forging quality, f.o.b. Pittsburgh.

Coke.—Blast furnace coke is now offered in this district at a shade under $3.25, Connellsville. Foundry coke remains unchanged, $5 to $5.50.

Plates.—Even those companies which are still adhering to 2.20c., Pittsburgh, admit freely that practically all of the business which has been placed in the past week or two has gone at 2c., Pittsburgh, or less. A coal company is reported to have bought 100 tons at 2c. On less than carloads the 2.20c. price is being maintained, but on lots of a carload or more of desirable sizes, even 2c. has been shaded. The cut prices have benefited two or three mills in a small degree, as much of the current business has gone to them, but on the whole the demand for plates has not been increased by the naming of the lower prices.

Structural Material.—Very little business in shapes is offered, but prices are soft. Some of the steel companies are convinced that plain material has been sold at 2c., Pittsburgh, by an Eastern mill, but positive evidence is lacking. Fabricators are making extremely low prices, $60 to $62, fabricated and delivered, which leaves a very small margin for fabrication and shipping costs over the price of the plain material. Most of the structural jobs now being placed are under 100 tons, and even these are few in number.

Bars.—The only demand is for reinforcing bars and the rerolling mills, which are quoting about 1.75c., Pittsburgh, on rerolled material, are getting most of this business. Soft steel bars are quoted at 2.10c., Pittsburgh, by the leading producers.

Sheets.—Lower prices on sheets are being named by some mills. Very little business is being done in this district.

Warehouse Business.—Demand for steel out of stock has dropped within the last two weeks to the lowest point of the year. Prices are unchanged, the following being named for Philadelphia delivery with reductions of $2 or $3 a ton, depending on the grade, for shipment out of town:

Soft steel bars and small shapes, 3.20c.; iron bars (except bands), 3.20c.; round edge iron, 3.50c.; round edge steel, iron finish, 1½ in. x ½ in., 3.50c.; round edge steel, planished, 4.25c.; tank steel plates, ¼-in. and heavier, 3.30c.; tank steel plates, 3/16-in., 3.52c.; blue annealed steel sheets, No. 10 gage, 4.20c.; light black steel sheets, No. 28 gage, 5c.; galvanized sheets, No. 28 gage, 6c.; square twisted and deformed steel bars, 3.20c.; structural shapes, 3.30c.; diamond pattern plates, ¼-in., 5.05c.; 3/16-in., 5.27c.; ⅛-in., 5.37c.; spring steel, 5c.; round cold-rolled steel, 4.60c.; squares and hexagons, cold-rolled steel, 5.10c.; steel hoops, No. 13 gage and lighter, 3.85c.; steel bands, No. 12 gage to 3/16-in. inclusive, 3.85c.; iron bands, 4.50c.; rails, 3.20c.; tool steel, 12c.; Norway iron, 8c.; toe steel, 4.50c.

Old Material.—A slight improvement in the demand for scrap is noted. Several of the Eastern steel mills are buying such quantities as can be obtained, but have reduced their price to $11.50, delivered, for No. 1 heavy steel. Dealers are paying $12 for steel scrap for storage. The tendency of prices, where changes have occurred, has been downward. We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$11.50 to $12.00
Scrap rail	11.00 to 11.50
Steel rails, rerolling	15.00 to 15.50
No. 1 low phos., heavy 0.04 and under	17.00 to 18.00
Car wheels	18.00 to 19.00
No. 1 railroad wrought	15.00 to 16.00
No. 1 yard wrought	14.00 to 15.00
No. 1 forge fire	10.00 to 10.50
Bundled sheets (for steel works)	8.00 to 8.50
No. 1 busheling	12.00 to 12.50
No. 2 busheling	10.00 to 11.00
Turnings (short shoveling grade for blast furnace use)	8.00 to 8.50
Mixed borings and turnings (for blast furnace use)	8.00 to 8.50
Machine-shop turnings (for rolling mill and steel works use)	8.50 to 9.00
Heavy axle turnings (or equivalent)	10.00 to 11.00
Cast borings (for rolling mills)	9.50 to 10.00
Cast borings (for chemical plants)	10.50 to 11.50
No. 1 cast	17.50 to 18.00
Railroad grate bars	12.50 to 13.00
Stove plate (for steel plant use)	12.50 to 13.00
Railroad malleable	15.50 to 16.50
Wrought iron and soft steel pipes and tubes (new specifications)	13.00 to 13.50
Iron car axles	No market
Steel car axles	No market

St. Louis

ST. LOUIS, June 7.

Pig Iron.—It seems practically impossible to move the pig iron market out of the doldrums in which it has continued for so long and the transactions are so few, so small and otherwise so uninteresting that the market may be regarded as entirely without feature. The expected activity, as a result of the settlement of the stove molders' scale, has not developed and in one or two instances stove molders have asked that shipments under contracts be deferred on account of the condition of their yards. Southern iron is still unable to compete with Northern iron in price and such few sales as are made of car lots are invariably either of Northern iron or from the local furnace which is operating on the East side. The West side furnace is still shut down. The East side furnace is delivering about half of its output to its allied interests and delivering it hot, while the remainder is going out on sales.

Coke.—There has been no business whatever in coke during the past week either in small immediate lots or on future contracts. This is due to the fact that melters are covered by supplies in the yard and under contract. There has been no change from the prices quoted at the Connellsville base figure.

Finished Iron and Steel.—In finished products both the mill representatives and the warehousemen continue to live chiefly on hope as the sales show no increase.

WASTE IN INDUSTRY

Report of Committee of American Engineering Council—Findings and Recommendations

ST. LOUIS, June 3.—Waste in industrial processes is causing enormous annual losses to the nation, according to the report of the American Engineering Council's committee on the elimination of waste in industry, made public at a meeting of the council's executive board here to-day. A plan of nation-wide co-operation among government, public, trade associations, industry, labor, bankers and engineers is outlined.

The waste inquiry was in charge of a committee of sixteen headed by J. Parke Channing, New York, as chairman, and L. W. Wallace, Washington, executive secretary of the American Engineering Council of the Federated American Engineering Societies, as vice-chairman. The committee was named last January by Herbert Hoover, then president of the council. The inquiry was carried on by a large force of field workers who obtained first hand information of conditions existing in the leading basic industries, particularly in New York, New England and Pennsylvania. The investigation is the beginning of a movement by the country's organized engineers to bring about better industrial conditions and more harmonious relations between capital and labor. This report, it is stated, is the first work undertaken by the Federated American Engineering Societies in rendering public service. It deals exhaustively with housing and building; ready-made men's clothing; shoes; metal trades, and printing.

Intermittent Employment Large Waste

The wastes of interrupted production are summarized as follows: "The margin of unemployment amounts to more than a million men; cyclical industrial depressions are causes of waste through idle men, plant, equipment and materials. Intermittent employment is not merely the cause of one of the largest wastes in industry, it is also the one big problem for which labor demands a satisfactory solution. Waste results from conflicts between management and labor, but the amount is much less than is popularly supposed. Large inventories of raw materials and finished product and unbalanced production are causes of waste resulting from idle materials. Large sums of money are invested in idle equipment, and over-equipment and factory buildings in many instances are larger than necessary."

In attributing waste to faulty management, the report says: "The average method of management is far behind standards which have demonstrated their practical value; billions of dollars are tied up in idle equipment and there is a large additional waste through maintenance and depreciation charges. Manipulations in raw material result in serious losses and present sales policies are a contributing cause of irregular production." High labor turnover is given as a rough index of one of the commonest wastes in industry.

As to restricted production, the report says: "Both employer and employees restrict output, the former usually by limiting the total output of an industry, the latter by limiting the rate of speed of output of individual workmen."

Recommendations Offered

The committee's recommendations for the elimination of waste include the following: "A national industrial information service should be established to furnish more timely, regular and complete information covering current production and consumption and stocks of commodities. A national statistical service should be established covering employment requirements and a national policy regarding public health should be fostered and encouraged. The national program for industrial rehabilitation should be encouraged and should offer opportunities for education and placement to those having physical defects as well as those handicapped because of industrial accidents. A nation-wide program of industrial standardization should be encouraged in conjunction with industrial interests, and the government should recognize the necessity for a revision of such federal laws as interfere with stabilization of industry." It is also recommended that a body of principles should be accepted which could be developed for the adjustment and settlement of labor disputes.

After outlining the support and help to be contributed by the public and by trade associations, the report takes up the responsibility of plant management. It declares that administrative policies should cover improvement of organization, administrative and management control; the stabilization of production; introduction of effective employment methods; creation of individual or collective research departments; industrial education; curtailment of practice of adjustments, cancellations and returns where customary; development of purchasing schedules; correlation of sales policies with production and accident prevention.

Modification of Union Rules Urged

Organized labor, it is urged, should co-operate to develop a policy for increasing output. The attitude of opposition or indifference to proper standards for production should be changed and a frank and aggressive insistence on such standards maintained. There should be a scientific examination of the bases for wages and certain union rules should be modified in regard to machine operation, apprentices and craft distinctions which result in restriction of output. Individual workers should realize their responsibilities for waste resulting from ill health and disregard of safety measures.

As to idle material: "The waste of idle material in large inventories of raw and finished materials is very large. Unbalanced production also results in a very large material idleness." Large waste is said to exist through plant idleness. The printing industry is cited as an example where vast sums of money are tied up in unnecessary stock resulting from great duplication of brands of paper. "The present investment of more than a hundred million of dollars in stocks of paper carried on hand to meet trade requirements of the printing industry," it is said, "could be cut in half through standardization."

The report mentions that the average plant in the metal trades group is from 25 to 30 per cent behind the best plant in output per employee, while the building industry is given as about 60 per cent efficient, and the waste in the shoe industry put at about 35 per cent.

The report states that on the whole over 50 per cent of the responsibility for the waste occurring in industrial processes can be placed at the door of management and less than 25 per cent at the door of labor. It is understood there was opposition in the council to the committee report, it being held that the findings of the committee were not definite and concrete enough for public issuance by a body of engineers. The board finally authorized publication of the report, not as one from the American Engineering Council, however, but purely as the findings of a committee.

Discussion on the Report

William McClellan, Philadelphia, a member of the board, representing the American institute of Electrical Engineers, and F. J. Miller, Bucks County, Pa., representing the American Society of Mechanical Engineers, criticized the report adversely, while L. W. Wallace defended the accuracy of the report. Mr. Miller said that the report gives conclusions without setting out the facts on which the conclusions were based. It charges, he said, inefficiency to large groups of industries in general, whereas it is more than probable that the facts from which the conclusions are drawn apply only to a few individual members of this group. Mr. McClellan said the report did not define the waste alleged nor cite the committee's authority for the charges made.

It was stipulated that the report be sent back to the committee for revision and members of the board are to receive all the information on which the committee based its conclusions and the board members may suggest any changes they may deem desirable to the committee in writing. As soon as completed and approved by the board, the full report will be given out for publication.

COMPETITION FROM FRANCE

Belgian Steel Market Conditions—Strike at Ougree-Marihaye

BRUSSELS, BELGIUM, May 16.—The iron and steel market in Belgium has been improving. Most of the plants have their order books filled until the end of June by reason of the English strike. At present 24 blast furnaces are in operation producing 3019 tons of pig iron per day.

The development of the past week was the general strike at Ougree-Marihaye works, for a trivial pretext, throwing out about 6000 workers, and resulting in the shutting down of four coal mines whose workers decided to quit as an "act of solidarity." The trouble dates back several months. It was provoked by the ill will of several coke oven workers who work six hours a day.

They refused to clean the ovens as had always been done before, and declared that from that time on they would operate the ovens themselves for their own account. Other workers joined them and the management called upon the gendarmes who put an end to this project. In the conference that followed the management demanded the dismissal of 45 workers for acts of insubordination; then in a spirit of conciliation it reduced the number to eight, then to seven, and finally proposed to make an example of three or four. But the workers insisted on the re-employment of all the coke oven workers. This the management refused. A complete shutdown was threatened, but the management got a few volunteers to operate the electrical equipment driven by blast furnace gas. Later these men also quit. The company issued a statement saying that the cessation of work would certainly lead to the cancellation of important orders and that it was to be feared these would be turned over to foreign firms, possibly German. As the strike continued numerous acts of violence were reported.

Coke is becoming very abundant in Belgium in view of the cutting down of pig iron production, caused by foreign competition. In May 25,000 tons was sent from Germany to Belgium, augmenting the stocks at the disposition of Belgian consumers. It is certain that if the price of Belgian coke does not go down appreciably, French and Luxemburg competition for finished products will be very serious for Belgium.

Belgian iron and steel manufacturers have taken note of the reduction from 600 to 550 fr. per ton in the price of beams in France which is expected to be followed by a similar reduction in the price of sheets and flats.

The French comptoirs evidently want by these means to get a foothold in outside markets and Belgian steel men are on their guard. Recent quotations have been, per 100 kilos: Merchant iron, export, f.o.b. Antwerp, 46 fr.; ordinary sheets, 60 fr.; merchant bars, 44 fr., interior; export, f.o.b. Antwerp, 46.50 fr.; scrap iron and steel, 12 fr.; ordinary coke, 117 fr.

British Iron and Steel Market

Cleveland Furnaces All Idle—Labor Threatens Further Trouble—Sterling Lower

(*By Cable*)

LONDON, ENGLAND, June 7.

Labor is threatening trouble on all sides; the coal strike conferences have been renewed, the cotton trade is at a standstill, the engineering trade and the wool trade are holding conferences with the Government regarding wage reductions.

Cessation of Cleveland pig iron production is now complete with the blowing out of the last two furnaces. Number 3 foundry iron is unobtainable and lower grades are unsalable. Official minimum quotations are unaltered. Hematite is practically idle except for a small improvement in export sales, but buyers are generally anticipating lower values. Tees prices are unchanged.

Pig iron exports for May amounted to 10,877 tons. Midland iron workers' wages have been reduced 35 per cent.

Tin plates are in fair demand, stock plates having been sold up to 27s. ($5.09) basis f.o.b. Only about 7 per cent of the South Wales tin plate capacity is active, due to the fuel shortage. One Japanese order for 13,700 boxes has been reported, of charcoal plates, which are to be filled from stock.

We quote per gross ton except where otherwise stated, f.o.b. maker's works, with American equivalent figured at $3.77 per £1 as follows:

Durham coke	£2	2				$7.92		
Cleveland basic	6	0				22.62		
Cleveland No. 1 foundry	6	5				23.56		
Cleveland No. 3 foundry	6	0				22.62		
Cleveland No. 4 foundry	5	19				22.43		
Cleveland No. 4 forge	5	17½				22.15		
East Coast mixed	8	0	&	£7	10*	30.16	&	$28.28
Ferromanganese	18	0	&	17	10*	67.86	&	65.98
Ship plates	16	0	to	19	0	60.32	to	71.63
Boiler plates	24	0	to	25	0	90.48	to	94.25
Tees	15	10	to	18	10	58.44	to	69.75
Channels	14	15	to	17	15	55.61	to	66.92
Beams	14	10	to	17	10	54.67	to	65.98
Round bars, ¾ to 3 in.	15	0	to	16	10	56.55	to	62.21
Rails, 60 lb. and up	13	0	to	15	0	49.01	to	56.55
Billets	11	10	to	12	10	43.36	to	47.13
Sheet and tin plate bars, Welsh	11	0	to	11	10	41.47	to	43.36
Galvanized sheets, 24 g.	22	0	to	22	10	82.94	to	84.83
Black sheets	19	0	to	20	0	71.63	to	75.40
Tin plate base box	1	5	to	1	9	4.71	to	5.47
Steel hoops	17	10	to	20	0	65.98	to	75.40

*Export price.

FAIL TO AGREE

Members of Steering Committees Appeal to Tariff Commission for Assistance

WASHINGTON, June 7.—Unable to agree upon the Longworth resolution making rates in the permanent tariff bill effective from the day of introduction in the House, Republican members of the steering committees of the House and Senate have appealed to the Tariff Commission, which is preparing a stopgap bill which would be along the lines but with modifications of, the Longworth resolution.

The joint conference of House and Senate Republican leaders to-day is accepted as further proof of differences within the Republican party itself over ad interim legislation which is opposed almost solidly by the Democrats and also gives evidence of the accuracy of reports that the Longworth resolution would have to be modified before passage by Congress could be brought about. It is felt by many Republicans in both branches that the Longworth resolution gives too much power to the Ways and Means Committee, which could determine rates that would be made effective from the time the permanent tariff bill is reported to the House. Members of Congress opposing the Longworth resolution but favoring ad interim legislation say both branches should determine rates rather than leaving it to the Ways and Means Committee. The conference reached no agreement but decided to further canvass the tariff situation before committing the Republican party as to ultimate policy.

Cleveland and Kent Companies Will Merge

CLEVELAND, June 7.—The Lamson & Sessions Co., Cleveland, maker of bolts, nuts and other products, and the Falls Rivet Co., Kent, Ohio, maker of bolts, nuts and rivets, will be merged July 1 in a corporation with a capital stock of $3,000,000, the name of which has not yet been selected. Both of the existing plants will be operated under the new organization. Stockholders of both companies will exchange their holdings for stock in the new company. Roy Smith, president, Falls Rivet Co., will become a vice-president of the new company, and the present officers of the Lamson & Sessions Co. will hold similar positions in the new organization.

INQUIRY FROM FAR EAST

Bridge, Pipe, Plate and Railroad Inquiries—Demand for Low Price Plate Shearings

NEW YORK, June 7.—While numerous inquiries continue to appear in the market, chiefly from Far Eastern sources, but little business has so far developed, with the exception of some of the larger government inquiries and those from Japanese sources. Export quotations of mills continue weak and generally lower than the domestic schedule. Pipe inquiries from India and the Far East are generally large. One export company through its German connection has received an inquiry on about 20,000 pieces of charcoal-iron locomotive boiler tubes in 17-ft. lengths for shipment to Reval. The order will probably go to German mills. A house dealing with the Far East has been requested to quote on 210,000 ft. of steel gas pipe, ranging in size from ⅜ in. to 2 in. and evidently being purchased for stock. Another large pipe inquiry being handled by a New York exporter is for a hydroelectric project in the island of Formosa. It specifies six lines of lap weld, steel pipe, 990 ft. long, capable of a 570-lb. pressure per sq. in. and 46, 50 and 54 in. in size.

Japan Inquiries for Bridges

Railroad purchasing continues to hold the lead in Far Eastern markets. In addition to the purchases and inquiries still in the market from Chinese railroads, recently mentioned in THE IRON AGE, the Pekin-Suiyuan Railroad will purchase 5 locomotives and 100 steel cars and the Shanghai-Nanking-Ningpo Railroad will purchase 6 British type locomotives and 100 passenger cars. In pursuance of the recently announced policy in Japan of renewing a large part of the railroad bridges in the vicinity of Tokio, inquiries are now in the market for 9 steel bridges; the two largest involve 1850 tons and 1500 tons of steel and the remainder are of smaller specifications. Quotations as low as 2c. per lb. base are understood to have been received on this material by exporters handling the inquiry.

Black sheets of light gage continue to be purchased in the Japanese market, one exporter during the past two weeks having booked orders for 350 tons. A Chinese inquiry, which is issued through a Chinese bank, calls for about 500 tons of tank plates and representatives in the Far East report a good demand for plate shearings, which are used for the manufacture of knives and small tools. Prospective buyers, however, as a rule refuse to consider present quotations on this material.

An inquiry has been received by the Wonham, Bates & Goode Trading Co., 251 Fourth Avenue, New York, for a continuous rod mill, capable of handling about 500 tons per 44-hr. week of 4 x 4-in., 300-lb. billets and producing Nos. 5 and 6 gage rods to be used in nail making and redrawing for manufacture into wire netting.

New Shanghai Development Company

The Fung Sheng Industrial & Commercial Development Corporation, capitalized at $2,000,000, of which one-half has been subscribed, is now in operation in Shanghai. The corporation will undertake the development of real estate holdings, industrial plants, mines, storage warehousing and general industrial financing. According to the *North China Herald*, the demand for power plants in China, which was active until the middle of 1920, is showing signs of resumption. German agents have been offering to book orders for electrical and other machinery at low prices for immediate delivery, but experiences with the delivery are reported to have been unsatisfactory.

The German subsidiary of an American export company reports business there generally slack and the few orders, domestic and export, that are being booked are filled without difficulty in Germany. It is reported by the Bureau of Foreign and Domestic Commerce that a German company is considering the establishment of a plant for building railroad cars on the northern coast of Java.

NEW BETHLEHEM SHAPES

Increased Flange and Web Thickness—New Beam Size and Light H-Columns

Additional mill capacity, recently completed and put in operation for the production of wide flange structural shapes, has led the Bethlehem Steel Co. to add a number of new sections to its present established line of Bethlehem structural shapes.

Three new beam sections are provided, designated as B24b, B22 and B18a. The new 24-in. and 18-in. beams, B24b and B18a, are to supply the need for beams having a greater carrying capacity than the previous line of 24-in. and 18-in. beams afforded. The new 22-in. beams supply sections intermediate in depth between 20 and 24 in., and have been adopted as an economical addition to the range of beam sizes.

The comparison of the new 24-in. and 18-in. Bethlehem beams with standard section beams, is as follows:

	Bethlehem Beams	Section Modulus		Standard Beams	Section Modulus
B24b.....	104.5 lb.	246.4	24 in.	115.0 lb.	246.3
	99.5 lb.	234.3		105.9 lb.	234.3
B18a.....	74.0 lb.	136.6	18 in.	85.0 lb.	135.6
	69.0 lb.	126.9		75.6 lb.	126.8

The increase in weight of the new beams is obtained by increasing the thickness of the flange as well as that of the web, instead of obtaining the entire addition in weight by increasing the thickness of the web only. This new method, on which patents are pending, permits obtaining an increase in section modulus practically proportional to the added weight. Thus B18a, 74 lb., compared with B18a, 69 lb., has an increase of 9.7 in section modulus, or about 7½ per cent increase in modulus, due to the increase of 5 lb., in weight, which is about 7½ per cent increase in weight also. By the process of manufacture the addition to flange thickness is made to the outside of the flange, thereby slightly increasing the depth of the beam, but the total variation in depth between minimum and maximum is not more than the usual allowable tolerance in depth necessary in any method of rolling beams.

New column sections are provided, supplementing the company's previous list of H columns and affording a line of sections lighter than its regular H columns. These supplementary column sections are to supply lighter columns for many purposes, including shop and mill building construction. A series of 6-in. columns, in various weights, is provided for specially light construction.

The flanges of the new beams have a bevel of 8 1-3 per cent, or a slope of 1 in 12. Flanges of the column sections have a uniform slope of 2 per cent. All weights include fillets, but areas and all other properties are given exclusive of fillets. Tolerances in weight and section and all other regulations concerning material, lengths, etc., conform to the established rules applying to the regular Bethlehem sections.

To aid in the selection of columns subjected to direct loads and also to bending produced by eccentric loads or by other means, bending factors have been added to tables of the dimensions and properties of the columns, thus to furnish a convenient method of converting the bending moment into an equivalent direct central load.

Railroads Ask Withdrawal of Advance of July, 1920

CHICAGO, June 7.—A substantial number of railroads which had not filed applications for wage cuts before June 1 have asked the Railroad Labor Board for a complete withdrawal of the 20 per cent wage advance of July, 1920. At the same time, they have asked that extra pay for overtime and uniform wages for the same classes of employees over the entire country be abolished. A referendum ballot has been sent out to 250,000 maintenance of way employees to determine whether they will accept the average 15.6 per cent cut announced by the board last week. Maintenance of way employees suffered a larger reduction than most other classes of railroad employees.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight Rates

Freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia	$0.35	St. Paul	$0.665
Baltimore	0.335	Omaha	0.815
New York	0.38	Omaha (pipe)	0.77
Boston	0.415	Denver	1.35
Buffalo	0.295	Denver (wire products)	1.415
Cleveland	0.24	Pacific Coast	1.665
Cincinnati	0.325	Pacific Coast, ship plates	1.335
Indianapolis	0.345	Birmingham	0.765
Chicago	0.38	Jacksonville, all rail	0.555
St. Louis	0.475	Jacksonville, rail and water	0.46
Kansas City	0.815	New Orleans	0.515
Kansas City (pipe)	0.77		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver, the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 55c.; ship plates, 70c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 75c.; sheets and tin plates, 60c. to 75c.; rods, wire rope, cable and strands, $1; wire fencing, netting and stretcher, $1; pipe, not over 8 in. in diameter, 85c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, ¼ in. thick and over, and zees, structural sizes, 2.20c.

Wire Products

Wire nails, $3 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of $1.50 and shorter than 1 in., $2; bright Bessemer and basic wire, $2.75 per 100 lb.; annealed fence wire, Nos. 6 to 9, $2.75; galvanized wire, $3.45; galvanized barbed wire, $3.85; galvanized fence staples, $3.85; painted barbed wire, $3.15; polished fence staples, $3.15; cement-coated nails, per count keg, $2.60; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days, net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 60½ to 63 per cent off list for carload lots, 59½ to 62 per cent for 1000-rod lots, and 58½ to 61 per cent for small lots, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets

Large structural and ship rivets.....$3.25
Large boiler rivets.....3.35
Small rivets.....60, 10 and 10 per cent off list
Small machine bolts, rolled threads, 60, 10 and 10 per cent off list
Same sizes in cut threads.....60 and 10 per cent off list
Longer and larger sizes of machine bolts..60 per cent off list
Carriage bolts, ⅝-in. x 6-in.:
Smaller and shorter, rolled threads..60 and 5 per cent off list
Cut threads.....50, 10 and 5 per cent off list
Longer and larger sizes.....50 and 10 per cent off list
Lag bolts.....65 per cent off list
Plow bolts Nos. 1, 2 and 3 head....50, 10 and 5 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts ⅝-in. x 4-in.:
Smaller and shorter.....50, 10 and 5 per cent off list
Longer and larger sizes.....50 and 5 per cent off list
Hot pressed sq. or hex. blank nuts.....$4.00 off list
Hot pressed nuts, tapped.....$3.50 off list
C. p. c. and t. sq. or hex. nuts, blank.....$4.00 off list
C. p. c. and t. sq. or hex. nuts, tapped.....$3.50 off list
Semi-finished hex. nuts:
¼ to 9/16 in. inclusive U. S. S....80 and 10 per cent off list
Same sizes S. A. E.....80, 10 and 10 per cent off list
⅝ to 1 in. inclusive U. S. S. and S. A. E., 70, 10 and 10 per cent off list
Stove bolts in packages.....80 and 10 per cent off list
Stove bolts in bulk.....80, 10 and 2½ per cent off list
Tire bolts.....65, 10 and 10 per cent off list
Track bolts.....4.35c. base

Square and Hex. Head Cap Screws

½ in. and under.....70 per cent off list
9/16 in. to ¾ in.....70 per cent off list

Set Screws

½ in. and under.....70 and 5 to 70 and 10 per cent off list
9/16 in. to ¾ in.....70 per cent off list

Rivets

Rivets, 1c. per lb. extra for less than 200 kegs. Rivets in 100-lb. kegs, 25c. extra to buyers not under contract; small and miscellaneous lots less than two tons, 25c. extra; less than 100 lb. of a size, or broken kegs, 50c. extra.

All prices carry standard extras f.o.b. Pittsburgh.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, $48; chain rods, $48; screw stock rods, $53; rivet and bolt rods and other rods of that character, $48; high carbon rods, $58 to $73, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes, 9/16-in. and larger, $3.25 to $3.40 base per 100 lb. in lots of 200 kegs of 200 lb. each or more; spikes, ½-in., ⅝-in., and 7/16-in., $3.40 base; 5/16-in., $3.40 base. Boat and barge spikes, $3.40 base per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh. Track bolts, $4.35 base per 100 lb. Tie plates, $2.50 per 100 lb.; angle bars, $2.75 per 100 lb.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., $12.30 per package; 8-lb. coating, I. C., $12.60; 12-lb. coating, I. C., $14.30; 15-lb. coating, I. C., $15.30; 20-lb. coating, I. C., $16.55; 25-lb. coating, I. C., $17.80; 30-lb. coating, I. C., $18.80; 35-lb. coating, I. C., $19.80; 40-lb. coating, I. C., $20.80 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars at 2.10c. from mill. Refined bar iron, 2.75c.

Welded Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card:

Butt Weld

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
⅛	50½	24	¼ to ⅜	+2½	+28½
¼ to ⅜	52½	26	½	27½	9½
½	56½	42	¾	33½	18½
¾	60½	48	1 to 1½	35½	20½
1 to 3	62½	50			

Lap Weld

2	54½	42	2	30½	16½
2½ to 6	58½	46	2½ to 6	33½	20½
7 to 12	54½	41	7 to 12	29½	16½
13 to 14	45	..			
15	42½	..			

Butt Weld, extra strong, plain ends

⅛	46½	29	¼ to ⅜	+10½	+43½
¼ to ⅜	48½	31	½	26½	14½
½	53½	42	¾	33½	19½
¾	58½	47	1 to 1½	35½	21½
1 to 1½	60½	49			
2 to 3	61½	50			

Lap Weld, extra strong, plain ends

2	52½	41	2	31½	18½
2½ to 4	56½	45	2½ to 4	34½	22½
4½ to 6	55½	44	4½ to 6	33½	21½
7 to 8	50½	37	7 to 8	24½	12½
9 to 12	45½	32	9 to 12	19½	7½

To the large jobbing trade an additional 1, 5 and 2½ per cent is allowed over the above discounts, which are subject to the usual variations in weight of 5 per cent.

Boiler Tubes

The following are the discounts for carload lots f.o.b. Pittsburgh:

Lap Welded Steel		*Charcoal Iron*	
1¾ in.	19½	1½ in.	+10
2 to 2¼ in.	30	1¾ in.	List
2½ to 3 in.	41	2 to 2¼ in.	—10
3¼ to 13 in.	47	2½ to 2¾	—15
		3 to 3¼ in.	—16
		3½ to 4½ in.	—20

Carload Discounts on Standard Commercial Seamless—Cold Drawn

1 in.	56	2 to 2½ in.	17½
1¼ in.	49	2¾ and 4 in.	20
1½ in.	48	4½ to 5 in.	7½
1¾ in.	25		

Hot Rolled

3 to 4 in. 30

These prices do not apply to special specifications for locomotive tubes nor to special specifications for tubes for the Navy Department which will be subject to special negotiations.

Sheets

Prices for mill shipments on sheets of standard gage in carloads, f.o.b. Pittsburgh, follow:

Blue Annealed

Cents per Lb.		Cents per Lb.	
No. 8 and heavier	2.80–3.00	Nos. 11 and 12	2.95–3.15
Nos. 9 and 10 (base)	2.90–3.10	Nos. 13 and 14	3.00–3.20
		Nos. 15 and 16	3.10–3.30

Box Annealed, One Pass Cold Rolled

Cents per Lb.		Cents per Lb.	
Nos. 17 to 21	3.65–3.80	No. 28 (base)	3.85–4.00
Nos. 22 to 24	3.70–3.85	No. 29	3.95–4.10
Nos. 25 and 26	3.75–3.90	No. 30	4.05–4.20
No. 27	3.80–3.95		

Galvanized

Cents per Lb.		Cents per Lb.	
Nos. 10 and 11	4.00	Nos. 25 and 26	4.70
Nos. 12 to 14	4.10	No. 27	4.85
Nos. 15 and 16	4.25	No. 28 (base)	5.00
Nos. 17 to 21	4.40	No. 29	5.25
Nos. 22 to 24	4.55	No. 30	5.50

Tin-Mill Black Plate

Cents per Lb.		Cents per Lb.	
Nos. 15 and 16	3.65–3.80	No. 28 (base)	3.85–4.00
Nos. 17 to 21	3.70–3.85	No. 29	3.90–4.05
Nos. 22 to 24	3.75–3.90	No. 30	3.90–4.05
Nos. 25 to 27	3.80–3.95	Nos. 30½ and 31	3.95–4.10

Non-Ferrous Metals

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Tin	Lead		Zinc	
June	Lake	Electrolytic	New York	New York	St. Louis	New York	St. Louis
1	13.25	13.25	31.37½	5.00	4.70	5.20	4.70
2	13.25	13.25	31.25	5.00	4.70	5.15	4.65
3	13.00	13.00	30.50	4.90	4.60	5.10	4.60
4	13.00	13.00	.....	4.90	4.60	5.10	4.60
6	13.00	13.00	29.50	4.90	4.60	5.05	4.55
7	13.00	13.00	29.00	4.75	4.50	5.05	4.55

NEW YORK, June 7.

No change for the better is reported and the markets continue exceedingly inactive. Demand for copper is light and the price tendency is easy. Tin has declined with the fall in exchange but there has been a little better buying. The lead and zinc markets continue flat and prices are lower.

New York

Copper.—There has been almost no business in the past week. The unsettlement in exchange values has affected this market so far as foreign buying is concerned and there has been no incentive for domestic consumers to make purchases, at least on any large scale. An easier tendency is noted in the market but the price of electrolytic copper depends upon the seller. Most of the leading producers will not sell for June delivery at less than 13.50c., delivered, but from some other sources it is conceded that moderate amounts, enough to fill present needs, can be obtained at 13.25c., delivered. We therefore quote the market at 13c., New York, and 13.25c., delivered, for June, with July ¼c. higher and third quarter at 13.75c., delivered. Lake copper is also inactive and quoted largely nominal at 13.25c., delivered. It is stated that the general market is by no means without its favorable feature. A fair amount of metal is going into consumption both here and abroad constantly, and it is stated that it is equal to at least 60 per cent of the pre-war rate. With production at an extremely low ebb the future of the market is not without its encouragement.

Tin.—The principal factor in this market has been the decline in exchange which at present is considerably below the values two weeks ago. This has resulted in lower prices in this market and in London and has been the cause of a moderate amount of buying. Late last Tuesday, May 31, there were a few sales of spot and future tin at 31.50c. and on June 3 there were future shipment sales of June-July at 30.50c. early in the day, with sales at the close of the day at 30.25c. Yesterday there were sales early in the day at 29.75c. and 29.50c. and at the close as low as 29.25c. The total that changed hands amounted to 100 to 150 tons, mostly future shipment and largely taken by dealers. To-day sales of about 200 tons were made down to 29c. The feature in spot tin is that this position is closely held and therefore hard to secure. The quotation for this position to-day was 29c., New York, for spot Straits. London quotations to-day were from £8 to £12 lower than a week ago with spot standard at £165 15s., future standard at £167 and spot Straits at £166 15s. Deliveries of tin into consumption for the month of May were 1225 tons with the quantity afloat and landing on May 31 at 2571 tons. Total imports for the five months of this year were 7353 tons, as compared with 23,013 tons to June 1, 1920. Arrivals thus far this month have been 505 tons with 2150 tons reported afloat.

Lead.—The only feature of interest in this market was the reduction late Monday of the quotation of the leading interest from 5c. to 4.75c., both New York and St. Louis. Very little business is reported by either the leading interest or the outside market. The market for some time has experienced the pressing of speculative lots at St. Louis until the outside market has reached 4.60c., St. Louis, which was probably the cause of the step taken by the leading interest. We quote the market largely nominal at 4.50c., St. Louis, or 4.75c., New York.

Zinc.—The market is absolutely flat with business confined to carload lots for early shipment and very few of these changing hands. Prime Western for early shipment is quoted at 4.55c., St. Louis, or 5.05c., New York, at which level a few lots have changed hands. It is possible that this could be shaded to 4.50c., St. Louis, on a fairly desirable tonnage for prompt shipment.

Antimony.—Wholesale lots for early delivery are quoted at 5.20c., New York, duty paid.

Aluminum.—Virgin metal, 98 to 99 per cent pure, in wholesale lots for early delivery is quoted by the leading producer at 28c. f.o.b. plant, with the foreign metal of the same grade available from other sellers at 23c. to 23.50c., New York.

Old Metals.—The market is quiet and business is hard to put through. Dealers' selling prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	12.50
Copper, heavy and wire	11.75
Copper, light and bottoms	9.75
Heavy machine composition	12.00
Brass, heavy	8.00
Brass, light	6.00
No. 1 red brass or composition turnings	9.50
No. 1 yellow rod brass turnings	6.00
Lead, heavy	4.50
Lead, tea	3.50
Zinc	3.50

Chicago

June 7.—Lack of consuming demand has resulted in further weakness in tin, lead and zinc. Producers and dealers find that they must cut prices to secure any business at all. Old metal prices are unchanged except for reductions in tinfoil and block tin. We quote Lake copper at 13.50c. in carload lots; tin, 31c.; lead, 4.70c.; spelter, 4.70c; antimony, 7.50c. On old metals we quote copper wires, crucible shapes, 8.25c.; copper clips, 8c.; copper bottoms, 7c.; red brass, 7c.; yellow brass, 5c.; lead pipe, 2.75c.; zinc, 2c.; pewter, No. 1, 17c.; tinfoil, 18c.; block tin, 21c., all these being buying prices for less than carload lots.

St. Louis

June 7.—The non-ferrous markets continue dull and with very little change in quotations. On car lots the prices asked are: Lead, 4.65c.; spelter, 4.75c. On less than car lots the prices asked are: Lead, 5.25c.; spelter, 5.50c.; tin, 34c.; copper, 14c.; antimony, 7.50c. In the Joplin district ore prices show no accretion of strength and lead, basis 80 per cent, sold at $55 per ton, while zinc blende sold at $22.50 per ton, basis 60 per cent. There is still no offering of calamine as the prices available do not warrant working the deposits. On miscellaneous scrap metals we quote dealers' buying prices as follows: Light brass, 4.50c.; heavy yellow brass, 7.50c.; heavy red brass, heavy copper and copper wire, 9c.; light copper, 8c.; pewter, 15c ; tinfoil, 18c.; zinc, 3c.; lead, 3.50c.; tea lead, 2c.; aluminum, 9c.

Standard Underground Cable Co. Will Build Plant in St. Louis

The Standard Underground Cable Co. of Pittsburgh, has purhased 600,000 square feet of ground in the northwestern industrial district of St. Louis, and will begin the erection of a manufacturing plant there before the end of this year, according to an announcement of the St. Louis Chamber of Commerce. The property is bounded by Kingshighway and Slevin, Geraldine and Brown avenues. It is stated that the expenditure for the St. Louis plant will be between $2,000,000 and $3,000,000.

Jordan W. Marsh, president of the company, said that the St. Louis plant will include departments for the drawing of copper wire and manufacture of weatherproof wire, magnet wire and lead covered cable.

GERMAN TREND DOWNWARD

Heavy Stocks Carried by Mills—Sheets Active in Southern Markets

(*Special Correspondence*)

BERLIN, GERMANY, May 17.—There is scarcely any change in the tone of the market. A slight rally took place when it was doubtful whether Germany would sign the ultimatum presented by the Entente. Prices stiffened for a few days, but gave way again as soon as any existing doubts were removed and the downward trend continues. The pig iron market was dull but for the business done in Luxemburg foundry iron No. 3 which was at first offered at 1050 m. per ton, and has been quoted in francs only during the last days of the past week. Prices ranged between 220 fr. and 240 fr., f.o.b. maker's works.

The rolled material market was also rather quiet except for some activity in warehouse stocks for immediate delivery. For these, comparatively fair prices were obtained. Angles fetched 2200 m. ($34.32) per ton, flats 2450 to 2550 m. ($38.22 to $39.78). Prices for bar iron showed a tendency to fluctuate. The highest quotation heard was 2100 m. ($32.76), but on the average prices were in the neighborhood of 1850 m. ($28.86). Spot stocks were obtainable at 2300 m. ($35.88), while Rhenish-Westphalian mills have already cut the 1800 marks level and are now quoting 1750 to 1700 m. ($27.30 to $26.52) per ton.

Luxemburg mills are following suit and are now quoting 290 to 300 fr. ($23.78 to $24.60) per ton. Practically the same prices hold true for section iron. Hoop iron started with 2700 m. ($42.12), but soon dropped to 2250 m. ($35.10) per ton. Structural material met with light demand, only the heavier shapes coming in for some inquiries. We quote channels at 2150 m. ($33.54), tees at 2500 m. ($39.00). A light business in rounds, bright, was done with prices for ⅜-in. to 9/16-in. bars averaging 3200 m. ($49.92) per ton. The wire market remained unchanged; we quote rolled material at 1600 m. ($24.96) for domestic delivery, while export stocks are offered at 1800 m. ($28.08) f.o.b. German port. For open hearth stocks, 50 m. more per ton is charged. Judging by the reports on hand, considerable stocks are still being carried both by mills and warehouses. We quote the following for railroad material: Heavy rails 2300 m. ($35.88), inclusive, fish plates 2350 m. ($36.66), heavy ties 1700 m. ($26.52), light ties 1600 m. ($24.96), stay plates 1750 m. ($27.30). Blooms, open hearth, are quoted at 1300 m. ($20.28) per ton f.o.b. maker's mill.

A slightly increased activity in sheets has been noticeable, especially in the South German markets. Heavy sheets are quoted at 2350 to 2450 m. ($36.66 to $38.22), medium sheets at 2550 to 2650 m. ($39.78 to $41.34), and thin plates at 2750 m. ($42.90). Quotations by Rhenish-Westphalian mills ranged within 2200 and 2100 m. ($34.32 to $32.76), one inquiry even limiting the price for light sheets to 1900 m. ($29.54), which met, however, with a refusal. Tin plate was quoted in the Southern markets at 4100 m. per ton, 205 m. per 100-lb. box ($3.20).

Business in the pipe and tube market was unsatisfactory. We quote cast iron flanged pipes at 300 m. per 100 kg. (2.12c. per lb.) and seamless boiler tubes 2¾ in. x 2¼ in. at 6.50 m. per metre (3.08c. per ft.).

FRENCH OUTLOOK IMPROVES

Prospect of German Indemnity Payment Brightens Market—Coke Declines—Wage Cutting Continues

(*Special Correspondence*)

LONGWY, FRANCE, May 14.—The position in Meurthe et Moselle and in Lorraine looks brighter as a result of the prospect of German payment of the indemnity. The Germans have placed in Amsterdam large sums in dollars and sterling, to be converted into French and Belgian francs. This is considered as a proof that Germany is resolved to pay.

There is a scarcity in orders for heavy bars and squares and rounds 2½ in. and larger. Various rolling mills are quoting widely diverse prices. The base price seems to be 44.50 to 45.50 fr. per 100 kg.

Further changes are expected in the near future, as the price of coke will probably be about 95 to 97 fr. per 1000 kilos during the next few months, and the new terms on fuel will doubtless influence the tone of the market in France.

No. 3 pig iron (rough skin) is quoted at 255 fr. per ton and evidently a price of 248 to 250 fr. per ton will be reached this summer in sympathy with a further decline in the prices of fuel. Stocks of pig iron are still considerable and but for the strike in England the depression in Belgium would have reached its climax.

The stock of domestic machine tools is still enormous. A pool has been formed by the French Government to provide the devastated sections with machinery equipment. The warehouses of this official pool are filled with German machine tools and difficulty is being experienced in disposing of the machinery, as with the rise of the franc the preference here is for American machinery.

Dullness prevails among the foundries. American methods and machinery are being adopted with a view to saving labor costs, which are high. Castings for engineering purposes may be had at 125 to 155 fr. per 100 kg., depending upon specifications. Railroad castings range from 100 to 120 fr. per 100 kilos, f.o.b. trucks.

French steel works contemplate the manufacture of thin sheets on a large scale. Three-sixteenth-inch sheets are being offered at 68 to 72 fr. per 100 kg., f.o.b. mill. Heavy plates are weaker.

Several works in Lorraine have been forced to curtail output and stop pig-iron production. In other districts, however, furnaces have been blown in.

Wage cutting continues. The decline in wages is from 1.25 to 3 fr. per day. Idle men are not numerous, as many are settling down to domestic work, agriculture, etc. Official statistics, however, show thousands of idle men.

Suit Against American Can Co. Is Abandoned

WASHINGTON, June 7.—The Government's case against the American Can Co., which was charged with being a monopoly in violation of the Sherman law, has been abandoned. On motion of Solicitor General Frierson, of the Department of Justice, the Supreme Court yesterday dismissed the Government's appeal from decrees of lower courts, which held the American Can Co. is not a monopoly.

The Supreme Court, before adjourning until Oct. 3, assigned several important cases for reargument, including the one against the United Shoe Machinery Co., charged with violation of the anti-trust law.

Fire at Plant of McKeesport Tin Plate Co.

Fire at the plant of the McKeesport Tin Plate Co., McKeesport, Pa., the night of June 6, destroyed the storehouse, stock house and shipping room. With the exception, however, of a few of the tin pots which the company had not used this year, the producing plant was not touched and officials of the company are advising customers that a resumption of operations will be possible in a few days after the debris is cleared away. As a matter of fact, several mills remained in operation during the early part of the fire and it would be possible to start up at once if it were not for the fact that there is no place to put the product. No reliable estimate yet is available as to damage sustained, but it is chiefly in finished material and in the building which housed the storage, stock and shipping departments.

PERSONAL

Charles V. Haynes, Philadelphia, gave an address on vapor heating systems before the Massachusetts chapter, American Society of Heating & Ventilating Engineers at the Engineers Club, Boston, June 2. The address included an historical sketch as well as the present application and future possibilities of the system.

Hjalmar E. Skougor, consulting industrial engineer, 150 Nassau Street, New York, has returned to New York from Europe after an absence of three months.

William J. Grose, for a number of years in the purchasing department of the Carnegie Steel Co., Pittsburgh, resigned recently to accept a position of bond salesman with Wells, Singer & Dean, Union Arcade, Pittsburgh.

W. H. Bleecker, Jr., formerly district sales manager at the Chicago office of the Page Steel & Wire Co., will be transferred to the New York office in the same capacity. E. J. Flood has been appointed district sales manager for all Page products at the Chicago office, 208 South La Salle Street, succeeding W. H. Bleecker, Jr.

L. A. Lambing has been appointed superintendent of the open-hearth department, Pittsburgh Crucible Steel Co., Midland, Pa. Mr. Lambing, who succeeded Edward F. McGeehan, formerly was assistant superintendent of No. 4 open-hearth department of the Homestead works, Carnegie Steel Co. He is a graduate of the University of Pittsburgh.

Prof. Warren J. Mead of the department of geology, University of Wisconsin, Madison, departed May 30 for Manchuria as one of a party of six experts commissioned to make a geological and engineering survey of iron ore and coal deposits along the South Manchuria Railway. The experts will return about Sept. 15. Professor Mead has been assigned to work particularly on iron ore exploration. The deposits found in the section which the railroad is having surveyed by the American commission are said to be very similar to the iron ore found in the Lake Superior region of Minnesota, Wisconsin and Michigan, in which district Professor Mead has had wide experience in exploration. Accompanying him are: Prof. W. R. Appleby, dean School of Mines, University of Minnesota; W. R. Emmons, state geologist of Minnesota; L. D. Davenport, Boston; W. H. Craigo and Frank Hutchinson, Duluth, Minn.

Oskar Kylin was recently appointed general sales manager of the Foster Machine Co., Elkhart, Ind. Mr. Kylin, who for the last five years has been chief engineer and a member of the executive board of the company, still retains his former position in addition to his new duties.

Charles D. Terry, assistant to the general superintendent of the National Tube Co., sailed on the Olympic, June 4, for a tour in Europe, including France, Switzerland, England and Scotland. He is accompanied by Mrs. Terry. As a member of the committee of the American Society of Mehanical Engineers on threading practices Mr. Terry went abroad in 1919 to confer with French and English representatives on an international threading standard for pipe fittings, valves, etc.

Charles Piez, president Link-Belt Co., Chicago, and nationally known as director-general of the United States Shipping Board, Emergency Fleet Corporation, addressed the Engineering Advertisers' Association of Chicago on June 7 at the Great Northern Hotel, Chicago, on "Advertising and Selling from an Executive's Viewpoint."

Several important changes in the sales department of the Midvale Steel & Ordnance Co., Philadelphia, were put into effect Monday, June 6. About two years ago, the general sales department was split into five divisions, each having its own manager, with John C. Neale, vice-president, in charge as general manager of sales. These five divisions are now consolidated into three divisions. Alfred C. Howell, who was in charge of the structural division, which took in plates, shapes and charcoal iron boiler tubes, becomes district sales agent in Philadelphia, succeeding Frank J. Krouse, who has been appointed assistant manager of the bar and billet division. Ward A. Miller, who was in charge of the distributers' division, which took in wire products and tool steel, has been appointed district sales agent in Chicago, succeeding the late Clifford J. Ellis. J. C. C. Holding becomes manager of the structural division, with L. S. Thomson as his assistant. L. R. Steuer remains as manager of the bar and billet division, with Frank J. Krouse as his assistant, and Stuart Hazlewood continues as manager of the forging division, with P. S. Rattle as his assistant. The structural division will handle sales of plates, shapes, tubes, cars, standard rails, splice bars and tie plates. The bar and billet division will handle sales of bars, wire products, billets, sheet bars and light rails, and will also handle all jobbing and export trade. The forging division will include, in addition to forgings, tires, gear blanks, wheels, axles and tool steel.

Stephen Badlam has severed his connection as sales engineer with the Philadelphia Roll & Machine Co., Philadelphia, and has engaged in business as an engineer, specializing in rolling mill equipment, with offices at 1019-1021 North American Building, Philadelphia. Prior to his connection with the Philadelphia Roll & Machine Co., Mr. Badlam was 12 years with the Pennsylvania Steel Co. in the operating department, and assistant chief engineer of the Pittsburgh Crucible Steel Co. during the building of its Midland plant, and also chief engineer of the Pittsburgh Seamless Tube Co. In the World War he was major of infantry on the General Staff, First Army, and was overseas for two years.

OBITUARY

W. A. JONES, president W. A. Jones Foundry & Machine Co., Chicago, died May 30, at his home in Laporte, Ind., of heart disease after having been in ill health for several years. He was 71 years of age. Before becoming established in Chicago, Mr. Jones was for several years in business at Marseilles, Ill. In Chicago he was connected with the Link-Belt Co. until 1890, when he founded the W. A. Jones Foundry & Machine Co. He specialized in the manufacture of pulleys and transmission machinery, doing general jobbing work also. He was president of the American Foundrymen's Association in 1901 when the first Chicago convention of that organization was held. His only son, Warren G. Jones, vice-president of the company, has conducted the business since his retirement several years ago.

ALEXANDER H. HANDLAN, president Handlan-Buck Mfg. Co., St. Louis, manufacturer of railroad supplies, died May 28 at his summer home in Oconomowoc, Wis., from heart disease after an illness of more than a year. He was 77 years old, and retired from active participation in the company's affairs about 20 years ago. Mr. Handlan began his career 52 years ago as a bookkeeper for M. M. Buck, a small dealer in railroad lanterns. He bought an interest in the business shortly afterwards, and finally bought out Mr. Buck. In 1901 he changed the name of the concern to its present form.

MICHAEL E. CONRAN, president M. E. Conran Co., Brooklyn, pipe and fittings, died May 25.

WILLIAM ARCHIE KYTE, sales manager and member of the board of governors of the Foster Machine Co., Elkhart, Ind., died May 24 at his home in that city. He was born at Middlebury, Ind., on March 1, 1878, and his association with the Foster Machine Co. started in 1905. Death was caused by nervous exhaustion and heart trouble after an illness dating from last January.

FRANK L. FERNALD, naval constructor, U. S. N., retired, died at his home at Eliot, Me., May 29, in his eighty-fifth year. He was the designer of the battleship Maine, which was destroyed in Havana Harbor.

IRON AND INDUSTRIAL STOCKS

General Trend of Security Values Has Continued Downward

Although assurances were given the country has passed through the worst of a financial strain, little industrially transpired the past week to inspire investment confidence. The general tendency of security values has continued downward. Although plans for Federal Reserve System banks to reduce rates during the summer were recently made public, money rates are high. In fact, it is difficult for many concerns to earn the interest, after fixed charges, on borrowed capital at present rate of production. This fact, coupled with heavy shrinkages in inventories, possibly explains the recent passing of dividends in many instances. Throwing over of non-dividend paying stocks has accelerated the general downward tendency of securities.

The reduction of 12 per cent in railroad labor wages, effective July 1, may be followed by a cut in transportation charges, consequently some investors figure the ultimate net gain for the carriers will be unimportant unless tonnages hauled increase to a greater extent than currently reported. No immediate supply and equipment purchases by the railroads appear likely and lower prices for railroad and equipment stocks have resulted. The demand for steel products, pig iron and coke likewise has encouraged comparatively little investment in producing company stocks. On the other hand, the lack of selling pressure is noteworthy. Automobile stocks have been sold the past week on further cuts in prices for machines. At the moment the textile industries are our brightest spots, although grain and cotton markets are responding to better statistical reports.

The range of prices on active iron and industrial stocks from Saturday of last week to Monday of this week was as follows:

Allis-Chalm. com.	31¼ - 34¼	Lackawanna Steel.	45½ - 48¼
Allis-Chalm. pf...	73¼ - 74	Midvale Steel.....	26 - 28
Am. Can com.....	29 - 30⅝	Nat.-Acme	— - 20
Am. Can pf.....	83⅛ - 83⅞	Nat. E. & S. com.	49 - 53
Am. C. & F. com.	122⅛ - 125	N. Y. Air Brake..	65 - 65¼
Am. C. & F. pf...	108⅛ - 109½	Nova Scotia Steel.	29 - 30
Am. Loco. com....	82½ - 85	Press. Steel com..	81 - 82¼
Am. Loco. pf.....	— - 101	Ry. Stl. Spg. com.	83⅜ - 84
Am. Radiator com.	— - 70	Ry. Stl. Spg. pf...	100½ - 100⅝
Am. Steel F. com.	28⅞ - 30	Replogle Steel.....	23¾ - 25½
Am. Steel F. pf...	84 - 85	Republic com.....	54⅛ - 56¾
Bald. Loco. com..	76⅜ - 83¼	Republic pf.....	— - 89¾
Bald. Loco. pf....	— - 99	Sloss com.....	38 - 38½
Beth. Stl., Cl. B..	54⅞ - 57	Sloss pf.....	— - 73
Beth. Stl., 8% pf..	99¼ - 100	Superior Steel....	— - 39¾
Chic. Pneu. Tool..	— - 60	Transue-Williams.	37½ - 38
Colorado Fuel.....	29½ - 30	Un. Alloy Steel...	26 - 28
Cruc. Steel com...	63¼ - 69¾	U. S. Steel com...	78⅞ - 81⅛
General Electric..	133 - 135	U. S. Steel pf.....	107¾ - 108½
Gt. No. Ore Cert..	27½ - 28½	Vanadium Steel...	29⅝ - 31¼
Gulf States Steel.	34 - 35	Va. I. C. & Coke..	— - 83
Int. Har. com.....	84⅜ - 89	Westingh'se Elec.	45½ - 46

Selling Industrial Stocks

YOUNGSTOWN, OHIO, June 7.—Owing to the financial needs of certain holders, selling is developing in preferred stocks of industrial interests. Omission or reduction of common dividend rates has or will materially affect many incomes with the result that cash is being realized in the sale of holdings. This situation, as well as the general slump which has overtaken the industry, has resulted in weakening some of the standard issues.

Commons have naturally declined in sympathy with the general business situation. On about 400 shares, common stock of the Brier Hill Steel Co. sold down to $17, which is equivalent to $102 for the old stock before the financial reorganization last year. This price represents a decline of $133 from the peak of this issue.

Youngstown Sheet & Tube Co. common is selling at $58, equivalent to $252 for the original common before the July, 1920, stock dividend, a decline of $125 per share.

Trumbull Steel Co. common has sold down to $19.75, which is equivalent to $98.75, or down about $75 from the high price.

United Engineering & Foundry common is sought at $177, the last sale price, and is offered at $183.

The St. Louis Coke & Chemical Co. has completed arrangements for financing of approximately $2,000,000 to take care of current liabilities. The National Enameling & Stamping Co. has a substantial interest in this concern.

The G. A. Ball Bearing Mfg. Co., 3051 West Lake Street, Chicago, has increased its capital stock from $75,000 to $200,000.

Sale of the property of The Immel Co., Columbus, Ohio, automobile body manufacturers, has been ordered by the common pleas court on the application of R. H. Schryver, receiver for the company. The property is held at approximately $250,000.

Industrial Finances

The Wisconsin Gear & Axle Co., Milwaukee, has increased its capital stock from $100,000 to $250,000, consisting of $50,000 of preferred and $200,000 of common shares. The concern manufactures axles and gears for the automotive industries. The plant and offices are situated at State Street and Hawley Road.

The Zenith Furnace Co., Duluth, Minn., has filed an amendment to its corporate articles in Wisconsin providing for an increase in capital stock from $1,500,000 to $3,000,000. W. B. Castle, Duluth, is president.

The Milwaukee Rolling Mill Co., Milwaukee, which recently placed in operation a new sheet mill representing an investment of about $1,750,000 at Forty-third Avenue and Grant Street, in West Milwaukee, has increased its capital stock by a new issue of $1,500,000 of preferred shares, making the total $3,000,000, in addition to 15,000 shares of common stock having no par value. The new preferred shares will not be issued immediately, according to officers of the company, but will be available when future expansion makes it necessary. The company operates the only sheet mill in the Milwaukee district and is producing blue, black, galvanized and annealed sheets. The capacity is 60,000 tons annually. B. B. Jack is general superintendent.

The A. L. Smith Iron Works, Chelsea, Mass., has increased its capitalization $150,000 by an issue of 1500 shares of first preferred stock, par $100. Arthur L. Smith is president and treasurer.

The Millers Falls Co., Millers Falls, Mass., tools, has increased its capitalization $165,200 by an issue of 1652 shares of preferred stock, par $100, against stock and securities. Philip Rogers is president and George W. Nims, treasurer.

A public offering of $4,000,000 Interstate Iron & Steel Co., Chicago, 8 per cent first mortgage 20-year sinking fund, series A, bonds, dated May 1, has been made. They are a part of an authorized issue of $10,000,000 bonds, and are a direct first mortgage in all fixed property of the company.

Penn Seaboard Steel Corporation voting trust certificate holders are offered the opportunity to extend until June 26, 1926, the voting trust agreement which expires June 26, 1926.

The combined profit and loss account of constituent companies of the British Empire Steel Corporation, Ltd., for the year ended Dec. 31, as filed with the New York Stock Exchange, showed a profit, after Government war taxes, interest, depreciation and all other expenses, of $6,235,127. Sales and other revenues amounted to $69,681,342 and cost of sales, etc., $58,865,096. Cash showed $1,261,884, notes receivable $429,171, accounts receivable $12,160,127, and inventories $18,480,185.

Bankrupt Company Busy

The John Obenberger Forge Co., Milwaukee, which is passing through bankruptcy proceedings, is increasing its operating schedule under permission granted recently to the trustee, John F. Gerdis, to re-open the works. To finance production, the United States District Court has authorized the trustees to borrow $60,000 from the First Wisconsin National Bank of Milwaukee, which is the largest creditor. The loan was approved by Referee John F. Harper. It bears 7½ per cent interest and is secured by certificates issued by the trustee. The Obenberger company has orders from the Nash, Packard, Dodge and other automobile manufacturing companies which require prompt delivery. Much of the business on the books represents reinstatement in part of large orders which were cancelled about eight months ago, as the direct result of which the Obenberger company was forced into the bankruptcy court.

Office Changes

General offices of the Eastern Fuel Co. and the Georges Creek Coal Mining Co. have been removed to rooms 404 to 410 Frick Building, Pittsburgh.

Laughlin & Barney, machinery and machine tools, Pittsburgh, have removed from the Wabash Building to the Union Arcade.

The U. T. Hungerford Brass & Copper Co., 180 Lafayette Street, New York, has organized a metal specialties department, which will handle all turned, spun, cast and drawn work, for which the company has manufacturing facilities. The new department will act in an advisory capacity to the branch offices in Boston, Baltimore, Philadelphia and San Francisco.

The John C. Brill Co., sales representative for iron and steel products, New Orleans, has been appointed district sales representative for Oklahoma, Arkansas, Texas and the balance of this Southwestern territory for the LaSalle Steel Co., Chicago, manufacturer of shafting.

Machinery Markets and News of the Works

MAY BUSINESS SLOW

First Week of June Brings No Improvement in Machine Tools

Aside from Probable Railroad Purchases in Chicago the Markets Are Lacking in Prospects

May was a poor month for machine tool builders and their selling representatives. In some instances the volume of sales for May showed a decline from April, nor has the first week of June brought anything encouraging, although in a few quarters inquiries are reported slightly better. The difficulty in closing orders, however, is one of the outstanding features in all sections of the country.

Aside from probable purchases by the Illinois Central and Rock Island railroads at Chicago, there is nothing in the way of immediate prospects of importance in any of the markets.

A sizable order for power hammers received by a Cincinnati dealer from a West Virginia company stands out in that market as a leading transaction.

Another slump in the automobile industry has set in, and there is no hope entertained for business from that source during the summer, at least.

In the railroad field the announcement of a wage reduction effective July 1 has brought no hint of probable railroad buying with the exception of a few inquiries for car repairs, principally from the Illinois Central, Missouri Pacific and Wabash.

New York

NEW YORK, June 7.

The past week brought no change in the machine-tool situation. Domestic demand for tools is confined to single machines, as has been the case for some months. No important business has developed from recent export inquiries. It is estimated that local dealers are doing about 20 or 25 per cent of what may be considered a normal business.

The crane market is extremely flat, practically no new inquiries having appeared in this district and few sales being reported. The Commissioner of Docks, New York, has issued an inquiry for four 2-ton electric winches for the East Fifth Street Pier. This is part of the 72 winches which will be purchased later. The Shepard Electric Crane & Hoist Co. has sold a 10-ton, 65-ft. span overhead traveling crane to the Pidgeon-Thomas Iron Co., Memphis, Tenn.; Wonham, Bates & Goode Trading Co. has sold the United Electric Light & Power Co. a 12-ton, 50-ft. boom crawl tread Orton & Steinbrenner locomotive crane, and the American Gas & Electric Co., 30 Church Street, New York, has purchased a used 25-ton Orton & Steinbrenner locomotive crane from the Simmons Machine Co., Albany, N. Y.

The Burns Brothers Coal Co., 50 Church Street, New York, has filed plans for a one-story, brick machine shop, 100 x 120 ft., at 442-48 107th Street, to cost about $22,000.

The Autoflong Corporation, New York, has been incorporated with a capital of $50,000 by W. W. Brown, J. T. Wilson and E. A. Kittel, to manufacture brake mechanisms for automobiles and other automotive equipment. It is represented by Leubuscher & Suling, 258 Broadway.

The Never Fail Products Corporation, New York, has been incorporated with a capital of $110,000 by W. O. Rogers, Jr., J. H. Ballantine and G. R. Pruden, to manufacture electric, gas and water measuring and controlling devices. George A. Gregg, Bridge Plaza North, Long Island City, represents the company.

The Rockland Light & Power Co., Nyack, N. Y., is planning the erection of an addition to its power plant, estimated to cost about $435,000, including new steam and electric equipment. Application has been made to the Public Service Commission for permission to issue bonds for $500,000 to defray the cost.

The Halpern-Wein Co., 110 West Fortieth Street, New York, will purchase a quantity of equipment, including machine tools, for use at railroad and car shops in Sweden.

The Greene Avenue Garage, Inc., Greene Avenue near Classon Avenue, Brooklyn, is having plans prepared for the erection of a one-story service and repair works addition, 50 x 200 ft., estimated to cost about $20,000, exclusive of equipment. John J. Carroll, 225 Greene Avenue, is architect.

The Essential Automotive Products Co., New York, has been incorporated with a capital of $120,000 by L. Liebling, H. S. Benedict and R. R. Hill, to manufacture automobile devices and equipment. It is represented by L. Backner, Maiden Lane.

The Luckenbach Steamship Co., 44 Whitehall Street, New York, will take bids up to June 15 for the construction of the first unit of its new freight terminal at Bull's Ferry, Edgewater, N. J., to cost $10,000,000 with equipment.

The New York State Gas & Electric Corporation, Ithaca, N. Y., H. C. Hopson, 61 Broadway, New York, representative, has made application to the Public Service Commission for permission to build a new power plant at Plymouth, Chenango County.

The Samaron Sheet Metal Works, Inc., New York, has been incorporated with a capital of $30,000 by A. Sommerfeld, P. Rosenberg and I. S. Matlaw, to manufacture metal goods. It is represented by M. C. Levine, 119 Nassau Street.

The Wire Grip Sanitary Brush Corporation, New York, has been incorporated with a capital of $50,000 by A. A. Meyerhoff, W. and M. Hertzberg, to manufacture wire brushes. L. Applebome, 302 Broadway, represents the company.

The Stanton Plating & Polishing Co., New York, has been organized by A. O. Jacobson and N. Elkin, 27 Graham Avenue, Brooklyn, to manufacture metal goods.

The Pierce Oil Corporation, 25 Broad Street, New York, is planning for a bond issue of $12,000,000 for extensions in refineries, operations, etc.

The Master Piston Ring Corporation, New York, has been incorporated with a capital of $50,000 by B. Bursch, J. I. Polstein and S. S. Budlong, to manufacture piston rings for automobile engines, and Rindred automotive products. It is represented by Sanders, Zelenko & Polstein, 217 Broadway.

The Kortum Buff Co., New York, has been organized by K. A. Kortum and C. Brandt, Jr., 99 Nassau Street, to manufacture electro-plating equipment.

The Millville Pulp & Pine Products Co., Millville, N. J., is completing plans for its new one and two-story plant at Millville and Cumberland roads, estimated to cost in excess of $75,000 with machinery. J. W. Arthur, Old Opera House Building, Millville, is architect. E. H. Hults, 218-20 Walnut Street, Philadelphia, Pa., is president.

A new one-story power house will be erected at the plant of the Rogers-Pyatt Shellac Co., 39 Essex Street, Jersey City, N. J.

The South Jersey Iron Foundry, Inc., Pleasantville, N. J., has been organized to manufacture iron and steel castings. A local plant will be established. Wray C. Arnold, Commonwealth Building, Philadelphia, represents the company.

The Standard Underground Cable Co., Washington Street, Perth Amboy, N. J., has plans under way for extensions and improvements in its plant to cost in excess of $200,000. The work will include the erection of several floor additions to present buildings and will aggregate about 100,000 sq. ft. of space for manufacturing operations. Upon completion it is proposed to increase the working force about 25 per cent, making a total of about 1800 operatives. C. C. Baldwin is vice-president and general manager.

The Board of Water Commissioners, Perth Amboy, N. J., has awarded a contract to Greisen & Thompson, Perth

Amboy, for a one-story machine and repair shop on King Street, for department service, at a cost of $22,760.

The Board of Chosen Freeholders, Passaic, N. J., has awarded contract to Giordano & McGinnis, 415 Highland Avenue, Lodi, N. J., for a two-story automobile service and repair building, 50 x 100 ft., on Marshall Street, to cost about $50,000.

The New Jersey Blower & Mfg. Co., East Orange, N. J., has been incorporated with a capital of $50,000 to manufacture mechanical fans, blowers, etc. Charles O. Geyer, 525 Main Street, represents the company.

L. A. Myers, Jr., Inc., 139-45 Ogden Street, Newark, N. J., manufacturer of metal products, has acquired property adjoining its plant at 138-44 Mount Pleasant Avenue, 100 x 100 ft., for extensions.

The Lauder & Shean Device Mfg. Co., Newark, has been incorporated with a capital of $500,000 by Frederick E. Lauder, Peter A. Shean and Otto Schunck, 810 Broad Street, to manufacture metal specialties.

The American Welding Co., 24 West Kinney Street, Newark, has filed notice of organization to operate a welding, brazing and metal cutting plant. Maurice Rehrlich heads the company.

The New Jersey Commercial Body Co., Burlington, N. J., manufacturer of automobile bodies, has acquired the one-story and basement building at 237-49 Elizabeth Avenue, Newark, on a site 140 x 150 ft., for the establishment of a new plant. Possession will be taken about June 15. The company is headed by S. A. Neidich, Burlington.

The Climax Rubber Co. of New Jersey, 1207 Firemen's Building, Newark, has been incorporated with a capital of $1,000,000 by J. Phillips Tarr, William J. Gilberds and Warner S. Rexford, to manufacture rubber products.

Edward D. Holly, Newark, and associates have organized a company to manufacture pipe, fittings and other plumbers' supplies and have acquired the factory at Dawson and South streets, 100 x 100 ft. The different buildings on the site will be remodeled and improved and machinery installed for manufacture. Possession will be taken at once. Others interested in the company include Joseph A. Thomson and A. W. Mayer.

The Sanitary Safety Caster Co., Newark, has been incorporated with a capital of $100,000 by Emil Chalupa, Fred Bien and George A. Schulte, 24 Scott Street, to manufacture casters and kindred metal products.

The Newark Die Co., Newark, has been incorporated with a capital of $50,000 by Leonard G. Aierstok, John Hohl and H. H. Kunzelman, to manufacture dies, molds and similar products. It is represented by Peck, Davis & Gray, 810 Broad Street.

The Diamond Bracket Co., 457 Eighteenth Avenue, Newark, has filed notice of organization to manufacture metal shade and curtain brackets and kindred products. Elmer J. Poorman, 327 South Sixth Street, heads the company.

The Bock Machine & Garage Co., 160-66 Main Street, East Orange, N. J., has filed plans for an addition to its works, to provide an aggregate floor space of about 25,000 sq. ft. J. L. Bock is head.

Chicago

CHICAGO, June 6.

Outside of probable purchases by the Illinois Central and the Rock Island railroads, there is little prospective machine-tool business. Not only the larger industrial companies, but even the small shops which have been responsible for most of the buying of late, are no longer showing any interest in new equipment. Sales totals for May indicate a decline from the April figures, and dealers report that the first week in June brought in practically no new business. Although railroad lists have been issued repeatedly without resulting in orders of consequence, the trade is looking with hope in that direction. The Illinois Central is expected to take action on its extensive inquiry within the next fortnight, while the Rock Island will probably buy during the current week against the small list published in this column on May 26. While it is true that the railroads have been reducing their shop forces and in some cases have closed their shops entirely, it is felt that this is a temporary expedient dictated by a desire to postpone work until the reduced wages go into effect. That the carriers are again taking steps to rehabilitate their rolling stock is indicated by the fact that the Illinois Central, the Missouri Pacific and the Wabash have sent out inquiries for figures on the repair of several thousand freight cars. Notwithstanding the fact that railroad traffic is light and there are sufficient serviceable cars to handle current business, sidetracks are so crowded with bad order equipment that they interfere with the operation of trains. On one line between Chicago and Milwaukee it is reported that every siding is full of bad order cars.

There is very little industrial plant construction in this territory and in Chicago the lockout of the building trades has brought all building to a halt. During May permits were issued in this city for 428 buildings, involving a cost of $2,967,750, which is by far the lowest amount represented by permits issued in that month in 10 years.

The H. McFarlane Co., manufacturer of automobile bodies, 532 South Canal Street, Chicago, has purchased a tract, 115 x 116 ft., in Green Street, north of Van Buren Street, where it proposes to erect a six story plant to cost $400,000.

The Atlas Copper & Brass Mfg. Co., 2734 High Street, Chicago, plans to construct a one-story addition, 50x125 ft., to cost $20,000. L. Ehle, 3810 Broadway, is the architect and engineer.

L. Engel, 3058 Armitage Avenue, Chicago, will soon let a contract for a one-story garage, 60 x 150 ft., at 3515 Armitage Avenue, to cost $40,000.

The Klose Weld Engineering Corporation, 219 East Twenty-fourth Street, Chicago, has been incorporated to take over the business of the Klose Welding Co. of the same address, which was not an incorporated company. The incorporators include Julius F. and T. M. Klose and A. Bartoli.

The Acme X-Ray Co., 223 West Madison Street, Chicago, has been incorporated with $150,000 capital stock by George M. McFedries, Julius J. Grobe, John Lawrie and Frederick Kull to manufacture X-Ray apparatus, surgical machinery, tools and instruments.

The U. S. Meat & Bone Cutter Corporation has been incorporated with $100,000 capital stock to manufacture bone cutters and meat machinery. The incorporators include Dunlop Smith, Edward R. Tiedebohl and John W. Clark. Manufacturing will not begin for a number of months and for the present temporary offices are in room 810, 209 South La Salle Street, Chicago.

J. A. Johnson, 5949 Ohio Street, Chicago, will build an automobile repair shop at 5615 West Division Street, to cost $4,000.

The Standard Steel Works, Kansas City, Mo., has commenced the construction of a one and two-story plant, 113 x 305 ft. on Holmes Street northeast of the Long-Bell Lumber Co. millwork warehouse, North Kansas City. The present plant is at Nineteenth Street and Tracy Avenue.

W. A. Masters, clerk school district, Chisholm, Minn., has called for bids on machine shop equipment for the local high school.

J. F. Richter, who for several years has conducted a machine shop at Big Sandy, Mont., has moved his equipment to Hardin and is now open for business at the corner of Second Street and Custer Avenue.

The C. & K. Tool & Die Works, 1637 West Lake Street, Chicago, is having revised plans prepared for its new one-story machine shop, 100 x 185 ft., instead of 100 x 125 ft., at Iowa Street and Forty-seventh Avenue.

Arthur A. Patterson, Inc., 332 South Michigan Avenue, Chicago, has been incorporated with a capital of $50,000 by R. W. Vanier, Fred W. Reinhardt and M. E. Corcoran, to manufacture mechanical equipment and electrical devices.

The Interstate Iron & Steel Co., 104 South Michigan Avenue, Chicago, has arranged for a bond issue of $4,000,000, for general operations, expansion, etc. Silas J. Llewellyn is president.

The Artificial Ice Co., 140 North Dearborn Street, Chicago, is considering the erection of a new ice manufacturing and refrigerating plant at Halsted and Ninety-fourth streets, to cost about $275,000, with machinery.

The Old Ben Coal Co., 332 South Michigan Avenue, Chicago, is planning for the construction of a new power house at its No. 16 Mine, 50 x 85 ft., to cost about $50,000.

The Christopher Motor Co., 3308 Sheffield Avenue, Chicago, is planning for the erection of a new two-story service and repair building, 125 x 125 ft., to cost about $85,000. J. A. Taggert, 19 South La Salle Street, is architect.

The Graham-Wittenborn Corporation, 35 South Dearborn Street, Chicago, has been incorporated with a capital of $40,000 by Leslie B. Graham, C. W. Taylor and W. W. Wittenborn, to manufacture speed accelerating and reducing devices and kindred mechanical equipment.

The Baker Ice Machine Co., Nineteenth and Nicholas streets, Omaha, Neb., manufacturer of ice-making and refrigerating machinery, has awarded contract to A. C. Bush, Omaha, for a one-story addition, 280 x 280 ft., to cost about $150,000 with equipment.

The City Council, Pawnee City, Neb., is having plans prepared for a new municipal electric power plant, to cost about $85,000 with equipment. E. T. Archer & Co., New England Building, Kansas City, Mo., are engineers.

Buffalo

BUFFALO, June 6.

The Meldrum-Gabrielson Corporation, Industrial Building, Syracuse, N. Y., manufacturer of milling machines, attachments, etc., is planning the erection of a new two-story machine shop on West Fayette Street, 70 x 150 ft., to cost in excess of $200,000 with machinery.

The Genesee Light & Power Co., Batavia, N. Y., is contemplating the construction of a new electric plant near Attica to furnish service in this section. Application for permission to build the works has been made to the Public Service Commission.

The Binghamton Street Railway Co., Binghamton, N. Y., is planning the construction of a new electric power house at Endicott, N. Y.

The American Safety Signal Sales Corporation, Rochester, N. Y., has been incorporated with a capital of $35,000 by C. R. Steim, H. R. Smith and A. F. Hancock, to manufacture signal devices for automobile service. John J. McInerney, Insurance Building, represents the company.

New England

BOSTON, June 6.

With one exception the few sales the past week concern single machines and were about equally divided between new and used equipment. The exception was four lathes with 60-in. swing and 40-ft. bed purchased by a shipping interest at a price close to $100,000. Manufacturers' quotations remain unchanged, but concessions were made to move some machines sold the past week. A fairly large press order is under negotiation and may be closed within a day or two.

More inquiries are in the market than a month ago and several are good prospects. One large electrical appliance manufacturer is asking prices on production equipment for experimental work in connection with a large Government contract. Sentiment among other users of metal working equipment appears better, yet future business is not sufficiently asured to justify immediate purchases of equipment. At the moment a majority of inquiries originate from smaller concerns developing new lines and with them the price is of primary importance. The Boston & Albany Railroad Co. has bought a 14-in. lathe. Bids are asked on an assortment of Government machine tools held at the Boston Navy Yard.

Several cranes are under consideration, yet prospective buyers appear in no hurry to cover.

The Springfield Bronze Co., Springfield, Mass., contemplates the erection of a one-story factory, 40 x 64 ft.

Plans are practically complete for a one-story machine shop, 300 x 400 ft., to be erected by the Meisel Press Mfg. Co., 944 Dorchester Avenue, Boston.

The Rockwood Sprinkler Co., Worcester, Mass., is building two one-story additions, 33 x 99 ft., and 35 x 80 ft., respectively.

The Turner Construction Co. has been awarded contract for a two-story power plant, 80 x 120 ft., for the American Woolen Co., Lawrence, Mass.

Plans will be soon completed for a two-story, U-shaped factory, 60 x 200 ft., to be erected by the Ansonia Electric Co., 55 Main Street, Ansonia, Conn.

The Instant Freezer Co., Springfield, capitalized for $25,000, has been granted a Massachusetts charter. Paul Werder, 61 Pearl Street, Springfield, is president, and Harold D. Kittinger, 151 Maple Street, treasurer.

The Hood Turbine Co., Boston, with Robert J. Hurley, 83 Endicott Avenue, Revere, president, and Curtis D. Chase, Wellesley Park, Natick, treasurer, has taken a Massachusetts charter, with a capital of $100,000.

Christian E. A. Gronbech, 49 Prospect Street, Keene, N. H., is president, and Harry F. Stahler, 20 Hilda Street, East Milton, Mass., treasurer of the New England Production Co., recently given a Masachusetts charter to manufacture a patented razor holder and other metal specialties.

The foundry department of the Albert Russell & Sons Co., Newburyport, Mass., marine capstans, etc., was damaged by fire last week with an estimated loss of $40,000. Plans are in progress for rebuilding.

Work is progressing rapidly on the new factory building of the George Baker & Sons Co., Brockton, Mass. The main plant will be 100 x 240 ft., with a floor space of 30,000 ft., and will be used for manufacturing tacks, nails, rivets, staples, washers, cotter pins, screws, etc. The annual capacity of the plant will be 3000 tons.

Charles H. Harris, Inc., 136 West Twenty-fourth Street, New York, has awarded a contract to Levering & Garrigues, 552 West Twenty-third Street, for its new one-story plant, 100 x 200 ft., on Main Street, Norwalk, Conn., for the manufacture of automobile windshields. It is estimated to cost about $75,000. Charles H. Harris is president.

The Plainville Casting Co., Plainville, Conn., recently incorporated with a capital of $50,000, has tentative plans under way for a new plant for the manufacture of castings and other metal products. It is headed by William Stewart and Charles F. Conlon, Plainville.

The Stoy's Machine Developing Co., Boston, has been incorporated with a capital of $25,000 to manufacture machinery. Samuel Stoy is president, and Samuel Goldstein, 10 Mildred Street, Dorchester, Mass., treasurer.

The Norwalk Washing Machine Co., Norwalk, Conn., has been incorporated with a capital of $50,000 by F. A. Giorchino and W. F. Tammany, 20 Fairfield Avenue, to manufacture electrically operated washing machines.

The Federal Wharf Machine Shop, Boston, has filed notice of organization to operate a machine and repair works at 148 Border Street, East Boston. Edmond J. Leveille, Jr., heads the company.

The Morris Automobile Radiator Mfg. Co., Worcester, Mass., has acquired property at 12 Harding Street for the establishment of a new plant for the manufacture of automobile radiators and other metal products. Morris Sepinuck heads the company.

The Lundin Electric & Machine Co., Inc., Boston, has been incorporated with a capital of $100,000 to manufacture electrically operated machinery and parts. Emil O. Lundin is president, and M. J. Savage, 10 Thatcher Street, treasurer.

A. Freedman, 27 Church Street, Springfield, Mass., has plans under way for a new one-story machine shop on Seventh Street, to cost about $17,000.

The Worcester Electric Tool Corporation, Worcester, Mass., is arranging for expansion and will concentrate production to a large extent on a new aluminum combination electric drill and valve grinder for automobile service. It is proposed to develop an output of about 100 of these machines a week. The company recently changed its name, having previously operated as the Stenman Electric Valve Grinder Co.

The Scovill Mfg. Co., Waterbury, Conn., manufacturer of brass goods, has filed plans for a one-story addition on East Main Street, 50 x 96 ft.

Philadelphia

PHILADELPHIA, June 6.

The Atlas Machine Tool & Welding Co., Philadelphia, has acquired the two-story building at Germantown and Stenton avenues, 101 x 115 ft., formerly held by the Weder Mfg. Co., manufacturer of surgical instruments, etc., for the establishment of a new plant.

The Philadelphia Rapid Transit Co., Land Title Building, Philadelphia, has filed plans for extensions and improvements in its car repair works at Kensington and Cumberland streets, to cost about $10,000.

The J. A. Harris Rim & Wheel Co., Philadelphia, is being organized by J. A. Harris and associates to manufacture metal rims, wheels and other equipment for automobile service. Application for a State charter will be made on June 20. The company is represented by Taylor, Robey & Hoar, Stephen Girard Building.

The National Umbrella Frame Co., Thirtieth and Thompson streets, Philadelphia, has filed plans for a one-story addition to its plant on Belfield Avenue, 60 x 120 ft.

The Rittenhouse Motor Car Co., 219 West Rittenhouse Street, Philadelphia, has awarded contract to Ketcham & McQuade, 1029 Brown Street, for a new two-story service and repair building at Germantown and Greene avenues, 40 x 80 ft.

The Paul E. Flotron Co., Philadelphia, is being organized by Paul E. Flotron, Harry W. Wolfe and Joseph Mundet, to manufacture ice-making and refrigerating machinery. Application for a State charter will be made on June 20. The company is represented by Hazleton Mirkil, Lafayette Building.

The Hurley Motor Co., Broad and Race streets, Philadelphia, has awarded contract to the William Steele & Son Co., Sixteenth and Arch streets, for the erection of a new building at 25 North Broad Street, 80 x 100 ft., to cost in excess of $500,000.

The Pioneer Auto Safety-Steering Device Corporation, Camden, N. J., has been incorporated with a capital of $100,000 by J. Lukens Anderson, Philip A. Weigel and Joseph Hoffman, 1225 Broadway, Camden, to manufacture steering equipment and other automobile devices.

The Behrens Crane Co., Merchantville, N. J., has been incorporated with a capital of $125,000 by Albert Burling,

Merchantville; Albert G. Behrens and J. Newlins Wilkins, Camden, N. J., to manufacture cranes and parts.

The Trenton Chilled Die & Casting Co., Trenton, N. J., has been incorporated with a capital of $100,000 by Richard B. Newton, B. N. Rich and John H. Conover, Houghton and Cortland streets, Trenton, to manufacture castings and other iron and steel products.

The Keeley Stove Co., Second and Linden streets, Columbia, Pa., has completed plans and will soon award contract for a new one and two-story building, 30 x 50 ft., to cost about $20,000.

The Pennsylvania Power & Light Co., Allentown, Pa., has taken title to property on Roaring Creek, near Danville, Pa., for the erection of its proposed new hydroelectric generating plant, estimated to cost about $3,000,000 with equipment. The company is operated by the Electric Bond & Share Co., 71 Broadway, New York.

The Standard Foundry & Machine Co., Punxsutawney, Pa., has been incorporated with a capital of $30,000 to manufacture machine parts, castings, etc. B. B. Thompson, Punxsutawney, is treasurer.

Pittsburgh

PITTSBURGH, June 6.

Closing of contracts for the mills and hammers for the new plant of the International Nickel Co., Huntington, W. Va., constitutes the most important business of the past week in the machinery and equipment market. The seven merchant mills for this plant will be furnished by the United Engineering & Foundry Co., Pittsburgh, while the Standard Engineering Works, Ellwood City, Pa., was the successful bidder for the 30-in. sheet mill and the 26-in. cold mill. Award of the four hammers was split between the Chambersburg Engineering works, Chambersburg, Pa., which secured the two smaller tools and the Massillon Foundry & Machine Co., Massillon, Ohio, which was awarded the two larger hammers. Motors and drivers, it is expected, will be placed this week. In general, business remains exceedingly slack, with some in the trade stating it is worse than it has been. There is basis for this assertion in that a number of inquiries which had been regarded as promising have been deferred, either because it is considered wise to await some definite signs of betterment or because the prospective cut in freight rates is expected to bring further price modifications. The Reilling Mfg. Co., Pittsburgh, which put out an inquiry some time ago for a combination punch and shear, has decided to defer purchase until business is better. We note a sale of a Union hob grinder and a Universal cutter and reamer grinder, both to go to Erie, Pa. Sales still run to individual machines and are supplied out of stock. The new boiler house for the Oliver & Snyder Steel Co., Oliver, Pa., is a duplicate of one at another plant of the company and the equipment list does not call for a crane. The United Engineering & Foundry Co., Pittsburgh, which had an inquiry out for a 15-ton overnead crane, with 5-ton auxiliary, has decided to do nothing until fall. Crane builders who have been figuring on the requirements for the new shops of the Atchison, Topeka & Santa Fe Railroad have been advised that while work on the shops will be pushed, purchase of equipment will go over until the fall. It is not expected that any business will develop until late in the year in connection with plant betterments and extensions of the LaBelle Iron Works, Steubenville, Ohio. The Wheeling Steel Corporation recently closed for a 10-ton hand-power Reading crane for one of its Wheeling plants. The Alliance Machine Co., Alliance, Ohio, was the successful bidder for the 10-ton overhead crane recently placed by the J. E. Moss Iron Works, Wheeling, W. Va. The Koppers Co., Pittsburgh, is reported to have closed for a champion 6-ton bucket trolley for installation at the plant of the Public Service Gas Co., Camden, N. J.

The Crane Co., 636 South Michigan Avenue, Chicago, manufacturer of pipe, fittings, steam specialties, etc., has taken bids for the erection of its new plant at Thirty-fourth Street and the Allegheny Valley Railroad, Pittsburgh. It will include a six-story and basement pipe and pipe bending shop, 192 x 292 ft., and is estimated to cost about $800,000 with equipment.

The Troop Mfg. Co., Pittsburgh, manufacturer of water heaters, tank heaters, etc., has removed its plant to 2516-26 Jane Street, Southside, recently acquired, comprising a two-story building 80 x 120 ft. It is proposed to triple the output and with available adjoining land, additions will be erected at a future date. Robert A. Troop is president.

The Titan Metal Co., Bellefonte, Pa., has tentative plans under way for the rebuilding of its two-story plant, recently destroyed by fire.

The Schusler-Sterrett Motors, Inc., Pittsburgh, is being organized by Howard H. Schusler, Walter Bieling and James R. Sterrett, Jr., 1927 Oliver Building, to manufacture automobile and truck parts, and operate a general repair works. Application for a State charter will be made on June 20.

The National Tube Co., Pittsburgh, has acquired the two brick buildings, 48 x 120 ft., at Washington and Second streets, Dravosburg, for $22,500, and will use the property in connection with its works.

The Feigley Accessories Corporation, Pittsburgh, is being organized by David A. Feigley, Walter C. Anderson and Samuel M. Hazlett, 708 Park Building, to manufacture automobile accessories and equipment. Application for a State charter will be made on June 20.

Fire, May 28, destroyed a portion of the plant of the Valvoline Oil Co., Butler, Pa., with loss estimated at about $400,000, including equipment and stock.

The North Pole Ice Co., West Carson Street, Pittsburgh, has completed plans for a new seven-story cold storage and ice-manufacturing plant, 100 x 200 ft., to cost about $400,000, including machinery.

The Forest Coal Co., Fairmont, W. Va., is planning to expend about $150,000 for the installation of new machinery at its properties, including considerable electrical equipment. The company recently increased its capital from $100,000 to $300,000. H. W. Showalter is president.

The Charleston Bolt & Forging Co., Charleston, W. Va., recently organized with a capital of $300,000, has acquired a building at Nitro, W. Va., for the manufacture of bolts, nuts, spikes, rivets and kindred products. It will defer the erection of a new plant, as previously announced. C. M. Dunnavant is president, and J. Peyton Warren, vice-president.

Fire on May 27 destroyed the plant of the Fairmount Carriage Works at Fairmount, W. Va., causing a loss of approximately $30,000. Part of the building had been used as a service station and garage by Fred Dietrich, the owner. It is understood that it will be rebuilt.

Baltimore

BALTIMORE, June 6.

The Baltimore Car & Foundry Co., Curtis Avenue, Baltimore, will build a one-story power house. Plans have been completed.

Joseph Thomas & Son, Inc., 818-36 Leadenhall Street, Baltimore, has filed plans for four two-story brick buildings on Leadenhall Street to replace its wood-working plant, recently destroyed by fire. The new works will cost about $300,000, including equipment.

The Holdtite Mfg. Co., 919 East Baltimore Street, Baltimore, has awarded contract to R. B. Mason, 308 West Madison Street, for its proposed plant, 50 x 142 ft., for the manufacture of rubber goods, estimated to cost about $28,000, exclusive of equipment. The machinery installation, including presses, etc., will cost approximately $30,000. Albert A. Esterson is secretary and treasurer.

Freight-handling equipment will be installed in the steel sheds to be erected by the Board of Harbor Commissioners, Wilmington, Del., in connection with harbor improvements, a first bond issue of $600,000 for which has been voted. Bids for the buildings will be received up to June 20.

The Common Council, Siler City, N. C., is planning for the construction of a hydroelectric power plant on the Deep River for municipal service.

A. L. Flint, general purchasing officer, the Panama Canal, Washington, will receive bids until 10.30 a. m., June 23, for equipment for canal zone service, including grab bucket, steel cable, magnet wire, locomotive shoes, vacuum pump, valves, brass tubing, micrometers, electrical equipment, etc., as set forth in Circular No. 1451. The assistant purchasing agent is located at 24 State Street, New York.

Fire, May 25, destroyed the plant of the Bahan Textile Machinery Co., Union, S. C.

The Bristol Stove & Foundry Co., Bristol, Va., has been incorporated with a capital of $50,000 to manufacture stoves, stove castings, and other iron and steel products. H. E. Wilkinson is president, and J. C. Rucker, secretary.

The Thompson Spring Co., Wilmington, Del., has been incorporated with a capital of $300,000 by Clarence W. Thompson, Walter K. Jeffers and Franklin L. Mettler, 832 Market Street, to manufacture springs for vehicles and automobiles.

The Standard Oil Co., Baltimore, has completed plans for a new one-story power house, 93 x 143 ft., on Third Avenue, to cost about $50,000.

The Faultless Piston Ring Co., Rome, Ga., has been incorporated with a capital of $200,000 by O. M. Lanham and George Garrison, Rome, to manufacture piston rings for automobile engines, and kindred products.

Detroit

DETROIT, June 6.

The Purity Stamping Co., Battle Creek, Mich., manufacturer of milk strainers, is contemplating the erection of a two-story factory. W. T. Hulcher is president.

The Metal Office Furniture Co., Grand Rapids, Mich., has awarded contract for an addition to the Owen-Ames-Kimball Co. It will be two stories, 150 x 150 ft., and cost $50,000.

The American Seating Co., Grand Rapids, Mich., has taken out a permit for an addition to cost $10,000.

The Angle Steel Stool Co., Otsego, Mich., it is reported, will soon be in the market for equipment to take care of its growing business.

The Wildman Rubber Co., Bay City, Mich., has awarded contract to the Bay City Stone Co. for the erection of the first unit of its tire manufacturing plant to cost $1,000,000. The structure will be of reinforced concrete, 161 x 365 ft., three stories and basement. W. W. Wildman is president.

The B-J Generator Co., Lowell, Mich., has been incorporated with a capital of $500,000 by John E. and O'Neill Best, and Nicholas J. Politis, 532 Ottawa Street, Grand Rapids, Mich., to manufacture steam and gas generators, pumps and similar machinery.

The Reliance Engineering Co., Lansing, Mich., has been incorporated with a capital of $25,000 by E. C. Shields, L. A. Wilford and Henry Fisher, Lansing, to manufacture gasoline engines and parts.

Fire, May 23, destroyed a portion of the plant of the Sturgis Electric Plating Works, Sturgis, Mich., with loss estimated at about $25,000, including equipment.

The Woodland Piston Co., Muskegon, Mich., has been incorporated with a capital of $75,000 by Herbert L. Woodland, Herbert H. Huntley and Percy G. Wilson, Muskegon, to manufacture pistons, piston rings and kindred equipment for automobile service.

The Jig Bushing Co., Pontiac, Mich., has been incorporated with a capital of $25,000 by Otis R. Briney, Lawrence M. Richards and Emmanuel B. Rummins, Pontiac, to manufacture jig bushings and similar equipment.

The Osgard File Works, Inc., Detroit, has been incorporated with a capital of $25,000 by E. L. and H. K. Deacon, and E. M. Osgard, 225 Orleans Street, to manufacture files, rasps, etc.

Ohio

CLEVELAND, June 6.

Some local dealers report a slight improvement in inquiries for single tools, but others find no change in conditions. The inquiries coming out from week to week that are not resulting in orders indicate that a fair volume of business is backing up, which is expected to be placed when business revives. Owing to the slump in the automobile trade there is virtually no business coming from that source at present. Before this there was a little activity on the part of automobile parts manufacturers. Dealers report a fair demand for machine tool repair parts and accessories.

In Cincinnati machine tool inquiries show a little improvement, but great difficulty is still being experienced in closing orders. Most of the inquirers need the tools, but either buy used equipment or decide to hold off purchasing for the present. A local dealer reports the receipt of a sizable order for power hammers from a West Virginia company, and a local manufacturer took an order for six machines from a company in the South. Part of the purchase by the Virginian Railroad will come to manufacturers in this city, and in addition to the tools recently bought by this road, a local builder has secured an order for two more machines. The Big Four has not yet purchased agianst its recent inquiry, but may do so this week, and action is expected to be taken by the Illinois Central in the near future. Lathe manufacturers report the receipt of several orders from the oil fields in the Southwest, the first from this source for some time.

The Marion Coaster Co., Marion, Ohio, has been incorporated with a capital stock of $20,000 to manufacture children's vehicles. Fred Haverman, Jr., James Lingo, N. B. Rule and others are interested.

The Lea Handle Co., Bucyrus, Ohio, has been incorporated with a capital stock of $20,000 and will manufacture baseball bats, bowling pins and other sporting goods. The company will take over the business that has been conducted by N. H. Lea, and is building a factory addition.

The Board of Trade, Urichsville, Ohio, has authorized the purchase of 12 acres as a site for a proposed factory of the Lucius Steel & Welding Products Co.

The Ohio Metal Stamping & Mfg. Co., Akron, Ohio, has been incorporated with a capital stock of $50,000 by R. B. Spake, C. L. Johnson and others to manufacture metal stampings.

The Aircraft Engineering Co., Dayton, Ohio, was recently incorporated with a capitalization of $50,000 to manufacture aeroplane parts. W. A. Fenrod, B. W. Dawson, John Connolly, E. L. Haas and Ralph Maple are named the incorporators.

Indiana

INDIANAPOLIS, June 6.

A 4-acre tract has been obtained at Mars Hill, a suburb of Indianapolis, as a site for a plant for the American Valve & Tank Co., a Delaware corporation with $200,000 capital stock. The first unit will be 50 x 150 ft. and will contain the machine shop, nickel plating and porcelain enameling departments. Iron and brass foundries will be built later. Charles B. Wedding, Chicago, formerly of Indianapolis, is president; Samuel Springer, vice-president, and Charles A. Wulf, secretary-treasurer. Mr. Wulf is the inventor of the American Line of plumbing supplies and the company will have exclusive manufacturing rights, though they have been made by other companies for several years.

The Graver Corporation, East Chicago, Ind., has secured the contract for a refinery for the Indiana Oil Refining Co., Columbus, Ind., at a cost of approximately $120,000.

The first unit of the plant of the Duesenberg Motor Co., Harding and West Washington streets, Indianapolis, has been completed at a cost of $300,000. A second unit is under construction and a third will be added. The company is dismantling its former plant at Elizabeth, N. J., and is moving much of the machinery to Indianapolis. B. A. Worthington is president.

The Martin Howe Coal Co., Bicknell, Ind., is planning to rebuild its tipple and mechanical plant at No. 1 mine, destroyed by fire,, May 24, with loss estimated at about $100,000, including equipment.

The Western Airline Co., 408 Broadway, Cincinnati, is planning the erection of two one-story buildings at Seymour, Ind., for the manufacture of airplanes and parts. C. E. Lay is president.

The Lavelle Foundry Co., Indianapolis, has filed plans for extensions in its plant on West Michigan Avenue.

The Upton-Dussell Co., Bristol, Ind., has been incorporated with a capital of $50,000 by Henry Dussell, Linford Upton and Arthur Semple, Bristol, to manufacture gasoline engines, parts and other kindred equipment.

The New York Blower Co., 608 South Dearborn Street, Chicago, manufacturer of mechanical fans, blowers, etc., is considering the erection of a one and two-story addition to its plant at Laporte, Ind. Henry Mathews is acting president.

The Burns-Pollock Electric Mfg. Co., Indiana Harbor, Ind., has been incorporated with a capital of $1,000,000 by A. J. Burns, Thomas Pollock and J. G. R. O'Hara, Indiana Harbor, to manufacture electrical machinery and appliances.

The Central South

ST. LOUIS, June 6.

Cosden & Co., Tulsa, Okla., will make extensions and improvements in the power house at their local oil works to cost about $100,000. New equipment will be installed.

Fire, May 31, destroyed a portion of the plant of the Oliver Gas Oil Burner & Machine Co., 2030-32 Pine Street, St. Louis, manufacturer of gas and oil burning equipment and devices.

The Massey Refining Co., Scottsville, Ky., has plans under way for the erection of a new oil refinery, with initial daily capacity of about 500 bbl. S. H. Massey is head.

The Illinois Central Railroad, 135 East Eleventh Place, Chicago, is considering the erection of additions to its repair shops and locomotive house at Paducah, Ky.

The Louisville & Nashville Railroad, Louisville, is building a new one-story boiler plant at Paris, Tenn., 100 x 125 ft., and estimated to cost about $100,000. The G. H. Remmel Co., 958 Logan Street, Louisville, is contractor.

The Signal Mountain Cement Co., Chattanooga, Tenn., is taking bids for the erection of a new plant, estimated to cost about $200,000, with equipment.

E. L. George, Bartlesville, Okla., secretary of the local Chamber of Commerce, is developing plans for the formation of a company to establish a new plant for the manufacture of automobile tires and tubes.

The Cameron Refining Co., Ardmore, Okla., has completed plans for additions to its refinery, to increase the daily capacity from 3000 to 4000 bbl.

The Collapsible Rim Mfg. Co., Asheville, N. C., has acquired the plant of the Buzz Engineering Co., Louisville, for new works for the manufacture of metal rims for automobile service. An addition will be erected for rolling mill operations. L. Culberth is president.

The Southerland Coal Co., Henderson, Ky., is planning to rebuild the coal tipple at its properties, and power house, destroyed by fire, May 25, with loss estimated at about $75,000.

The Duplex Tire & Rubber Co., New Gates Hotel, Joplin, Mo., is arranging for the erection of a new three-story plant on Seventh Street, 100 x 300 ft., for the manufacture of automobile tires and tubes, estimated to cost about $100,000.

The Mendenhall Torpedo Co., Duncan, Okla., has been incorporated with a capital of $20,000 by G. L. Wilson, Duncan; W. B. Hamilton and T. W. Mendenhall, Wichita Falls, Tex., to manufacture torpedoes and other explosives.

Fire, May 24, destroyed a portion of the works of the Gordon Metal & Iron Co., Bunker and James streets, Kansas City, Mo., with loss estimated at about $50,000.

The State Board of Education, Topeka, Kan., J. A. Kimball, business manager, will take bids up to 2 p. m., June 21, for a new two-story power plant at the University of Kansas, Lawrence, to cost about $100,000.

Milwaukee

MILWAUKEE, June 6.

Only a small volume of machine-tool business is passing, orders usually being for a single tool for immediate shipment. There is a fair amount of inquiry but these usually indicate that transactions will be closed only at liberal concessions, which sellers are not inclined to grant. While the used tool market is not so active as before, this class of machines is giving perhaps keener competition. Hope is expressed that the automotive industries will be able to pick up output following the general reductions of prices on passenger cars to the public, which is counted upon to stimulate a demand that flattened perceptibly in the last four to six weeks.

Steel founders have been compelled to reduce operations still further, especially those specializing in heavy work. Gray and malleable shops are able to maintain forces at the high point reached recently following a period of sharp curtailment.

The E. & W. Co., 325 Oregon Street, Milwaukee, manufacturer of trailers, trucks, convertible truck attachments, shock absorbers, etc., has increased its capital stock from $200,000 to $225,000 of preferred stock and 4000 shares of common stock without par value. The concern is building a new shop, 60 x 120 ft., at Cedarburg, Wis., to be ready about Aug. 1.

The Sphinx Machine Co., Milwaukee, has been organized with a capital stock of $25,000 preferred, plus 500 shares of common stock without par value, to manufacture ice and refrigerating machinery. Walter F. Teschan, president Milwaukee Concrete Mixer Co., 955 Thirtieth Street, and Henry L. Krueger, Frank C. Schroeder and H. W. Rottel are incorporators.

Henry Powers & Co., Chippewa Falls, Wis., will build a public garage and service building, 66 x 82 ft., two stories and part basement, estimated to cost $25,000. The architects are Schopp, Durch & Camastile, local.

The Board of Industrial Education, Fond du Lac, Wis., awarded the contract to the Immel Construction Co., local, for the erection of a $75,000 addition to the central continuation school and manual arts institute. Purchases of additional equipment will be made soon. J. E. Hennen is architect.

The Lazear Products Co., Racine, Wis., has been incorporated with an authorized capital stock of $100,000 to manufacture automotive accessories, parts and metal products generally. The incorporators are Chester Dahl, Charles F. Wratten and M. E. Walker, attorney.

The Zwebell Brothers Co., 482 Milwaukee Street, Milwaukee, has awarded the general contract to Walter Tuckwell, 575 National Avenue, for a brick, steel and concrete machine shop, 60 x 100 ft., part two stories and basement, for manufacturing vulcanizing, tire repair and other automotive machinery, tire molds, etc. The investment will be about $45,000.

The Modern Pouring Device Co., Port Washington, Wis., has been granted a charter to manufacture pouring and lifting devices, cranes, hoists and similar equipment. The capital stock is $50,000. The incorporators are Max Goldberg, M. J. Knappe and Norman E. Henze, all of Port Washington.

The Algoma Foundry & Machine Co., Algoma, Wis., is erecting a small addition for testing, assembling and finishing gas engines, feed cutters and other farm specialties.

The Board of Education, Barron, Wis., will close bids June 10 for the construction of a $50,000 addition to the Barron high school, to be equipped for vocational training. The architect is Carl Volkman, Eau Claire, Wis.

The Giant Grip Co., Oshkosh, Wis., has increased its authorized capital stock from $125,000 to $250,000 to finance development of the business and future extensions. It was originally established as the Challoner Co. The principal products are portable sawmill and wood-working outfits, anti-skid chains for motor trucks and light forgings.

The Hartford Tool & Machine Works, Hartford, Wis., Fred F. Jordan, proprietor, is making repairs and replacements of buildings and equipment, which were badly damaged by fire on May 15. Later it is the intention to build a brick and concrete shop, 50 x 90 ft.

The More Power Spark Plug Co., Milwaukee, has been chartered with a capital stock of $200,000 to manufacture spark plugs and other ignition devices for gas engines. The incorporators are Roy G. Hale, Edwin Krenzel and August Haberer, 889 Thirty-ninth Street.

The South Side Garage, Inc., 1133 Indiana Avenue, Sheboygan, Wis., will build a two-story brick addition, 32 x 45 ft., to its garage. It will be used largely for repairs, service and machine work.

The Moloch Co., Kaukauna, Wis., manufacturer of automatic stoking equipment, power hammers and special machinery, expects to take occupancy of its new plant costing $150,000 about July 1. The machine shop is receiving equipment and the installation of electric cranes is being made in the foundry. It is a consolidation of the Kaukauna Foundry & Machine Works and the Moloch Automatic Stoker Co., formerly of Chicago.

The Oshkosh Tractor Co., Oshkosh, Wis., has been incorporated with a capital stock of $150,000 of preferred stock to manufacture tractors, engines, implements, etc. The organization is effected for the purpose of transferring the LaCrosse Tractor Co., from LaCrosse, Wis., to Oshkosh, and it is intended to erect a group of buildings during the summer. Harvey P. Phyner, Milo J. Gilbert and Bart W. Heiss, all of Oshkosh, are the incorporators.

The Radiolite Mfg. Co., Milwaukee, is being organized with a capital stock of $150,000 to manufacture kerosene vapor lamps. The device has been in production on a small scale for three years. A factory will be leased and some new equipment will be purchased. The incorporators are Dr. Robert G. Kohlsdorf, E. Cassidy and Adolph Kanneberg, attorney, 82 Wisconsin Street, Milwaukee.

The J. F. Davis & Sons Co., Chicago, manufacturer of boilers, tanks, smokestacks and other plate work, has acquired the property of the DePere Mfg. Co., DePere, Wis., also manufacturing similar lines. The new owner plans to resume operations about June 15 and is overhauling the plant and retooling portions of the works. The DePere company was organized about five years ago and took over the plant and equipment of the former Lyons Boiler Works Co. The Davis company has headquarters in the Harris Trust Building, Chicago, and operates works at Boston, Hopewell, Va., and Carney's Point, N. J. It is capitalized at $500,000. J. F. Davis is president and general manager.

The Jenkins Machine Co., Sheboygan, Wis., manufacturer of wood-working tools and machinery, has purchased the patent rights to a new routing and carving machine of the multiple type designed by Julius Hamacheck, Two Rivers, Wis., and will place it in production immediately. The machine is practically automatic and is operated by an electric motor and has a maximum speed of 20,000 r. p. m.

The Racine Engineering Co., Racine, Wis., manufacturer of tractors, has decided to relocate in Sheboygan, Wis., and will be reincorporated at once as the Dodge-Sheboygan Co., with a capital stock of $100,000. The product is known as the Dodge Universal Truc-Trac, being a combination machine designed for the work of a motor truck, farm tractor, field hauler and cultivator. It is intended to erect a one-story brick and steel shop building, 60 x 150 ft., as the first unit of the new work, to be ready about September 1. A. Y. Dodge is president and chief engineer.

The Biggam Trailer Co., 802 First Wisconsin National Bank Building, Milwaukee, organized several months ago with a capital stock of $200,000, is considering tentative plans for a factory. Since organization its production has been handled under contract with existing shops. Details of the new construction and equipment project have not been divulged. H. F. Biggam is president and general manager.

The Common Council, Kaukauna, Wis., has engaged W. E. Reynolds, architect, to design a two-story brick, steel and concrete municipal building, 100 x 145 ft., to contain a vocational training school. The estimated cost is $200,000, including manual arts equipment. The Schartow Iron Products Co., Racine, Wis., has been organized with a

capital stock of $25,000 by F. E. Schartow, Andrew Matson and William Christensen, to manufacture hardware specialties, automotive accessories and equipment. Mr. Schartow, several months ago, retired from the Schartow Mfg. Co., South Milwaukee, Wis., which he founded in 1912. A machine shop has been established in Racine but enlargement is planned.

The Village Board, Goodman, Wis., has awarded the general contract to the Foster Construction Co., 114 Grand Avenue, Milwaukee, for a two-story high school, with manual arts department, 88 x 175 ft., estimated to cost $100,000. The architect is Edward Tough, Madison, Wis.

The Illumine Products Co., Milwaukee, has been incorporated with a capital stock of $10,000 to manufacture automobile and other accessories and specialties. The incorporators are Clifford L. LaJuenasse, Chris Trinkl and John F. Wulf, 90 Mason Street, Milwaukee.

California

LOS ANGELES, May 31.

The Southern California Edison Co., Los Angeles, has acquired property at Harvard and Walnut streets, Fullerton, Cal., for the erection of a new power house to cost about $50,000.

The Clark-Turner Piston Co., Los Angeles, manufacturer of pistons for automobile engines, will install considerable new machinery at its plant for increased production.

The United States Electric Steel Products Co., Inc., San Francisco, has acquired about 200 acres at Sacramento, Cal., for the erection of a new plant to manufacture steel products. A power plant will also be constructed. The Electric Furnace Construction Co., 908 Chestnut Street, Philadelphia, is interested in the project, and will handle all the electric furnace installation. It is said that the new works will cost in excess of $5,000,000.

The Atchison, Topeka & Santa Fe Railroad Co., Los Angeles, has filed plans for a new one-story repair shop at San Bernardino, Cal., estimated to cost about $50,000.

The Gulf States

BIRMINGHAM, June 6.

The Cadenhead Auto Rim Co., Tarrant, Ala., is completing the first unit of its new works for the manufacture of metal automobile rims, and plans to occupy the structure at an early date. It comprises two buildings, 60 x 160 ft. and 60 x 120 ft., and it is proposed to develop an initial daily output of about 3000 rims. Later other additions will be erected. J. T. Cadenhead is president.

The Vulcan Radiator Co., Birmingham, Ala., recently organized, has leased a building for the establishment of a plant to manufacture automobile radiators and other metal specialties. A machine and repair works will be installed, as well as automobile body department. Robert H. Alexander is president, and R. G. Alexander, secretary and treasurer.

The Chicasaw Shipbuilding & Car Co., Fairfield, Ala., is planning for the early occupancy of its new plant for the manufacture of pressed steel cars. With orders on hand for about 1000 cars it is proposed to develop an output of 25 cars per day.

Charles Colvin, Sheffield, Ala., and associates, are planning the establishment of new works for the manufacture of fire hydrants and kindred products. A site is being selected.

The Birmingham Canning Machinery Co., Birmingham, Ala., is planning for the erection of a new factory for the manufacture of canning machinery to be operated by steam pressure.

The F. H. Koretke Brass & Mfg. Co., 922-26 Magazine Street, New Orleans, La., is considering the erection of a one-story addition to its brass foundry. W. E. Gosselin is vice-president and general manager.

Fire, May 23, destroyed a portion of the plant of the Parkersburg Rig & Reel Co., Ranger, Tex., manufacturer of oil-well machinery, with loss estimated at about $50,000.

The Lucey Co., Houston, Tex., recently organized to manufacture oil-well equipment, has filed plans for a new factory, 50 x 75 ft., estimated to cost about $25,000. Neal Lucey, box 1072, is president, treasurer and general manager.

The Florida Oil & Refining Association, Tampa, Fla., has acquired about 1000 acres at Piney Point, near Ross, Fla., for the erection of a new refinery. It will be constructed in two units, with initial capacity of about 2000 bbl. per day, and is estimated to cost about $250,000, including machinery. R. H. Webster is president.

The Common Council, Georgetown, Tex., is planning for the installation of considerable equipment in the addition to be erected at the municipal electric power plant, comprising engine, generating apparatus, and auxiliary operating machinery. Work will commence at once.

J. P. Sutton, New Orleans, La., is in the market for equipment for his foundry recently destroyed. A new building, 110 x 150 ft., will be erected.

The city of Meridian, Miss., has voted $600,000 for the equipment of an electric light and power plant.

Canada

TORONTO, June 6.

The demand for machine tools has again fallen off. Buyers are only entering the market for single tools and these are less active than a week ago. Small tools are showing more activity and some users are entering the market with larger lists. There is still a tendency on the part of some dealers to shade prices, but even this is not having a stimulating effect. Used equipment is still moving in a fairly active way, but little buying is being done. A new price is announced on taps which amounts to a reduction of about 10 per cent.

W. H. Mortimer, Walkerton, Ont., is in the market for a drilling machine.

Edgar B. Rolstop, Kerrobert, Sask., is in the market for a small sawmill outfit and planer, also water-wheel equipment.

The town of Antigonish, N. S., will build a pumping station at a cost of $15,000 and will install other equipment.

Bids are being received by the chairman and members of No. 2 Committee, London, Ont., E. S. Little, mayor, for four horizontal centrifugal sewage pumps of 1350 Imperial gal. per min. capacity each, against a head of 50 ft.

London Motors, Ltd., East London, Ont., W. Stansell, manager, will have plans prepared at once for the erection of a factory.

The iron foundry owned by Fleming Brothers, Cabot Street, Halifax, N. S., was destroyed by fire with loss of $15,000. It will be rebuilt.

The Canadian Johns-Manville Co., Ltd., with sales office at Montreal and Toronto, and which for several years has been operating asbestos properties at Asbestos, Que., has awarded contracts for the erection of a plant in that town, where it will manufacture all classes of asbestos products formerly imported from the United States.

The general contract for an addition to the power house to cost $80,000 for the Montreal Light, Heat & Power Co., 83 Craig Street West, Montreal, at Cedar, Que., has been awarded to Anglin-Norcross, Ltd., 65 Victoria Street, Montreal.

SHORT TRADE ITEMS

The Edgeworth Steel Co., 92 Washington Street, North Boston, has succeeded Fitz, Dana & Co., heavy hardware established in 1866 and until recently located at 110 North Street. The new firm consists of D. W. Stressenger, W. W Hanson and L. B. Hutchings. It has taken over the Fitz Dana & Co. warehouse at Edgeworth, Mass.

The firm name of Churchill, Morgan, Crittsinger, Inc. Worcester, Mass., grinding machines, has been changed to the Morgan Grinder Co.

Reed, Fears & Miller, Inc., Boston, New York and Philadelphia, pig iron and fuel, announce the establishment of a coal department at 514 Stock Exchange building, Philadelphia, which will be under the direction of Jervis W. Burdick.

The Equipment Corporation of America, having offices and plants in Chicago, Pittsburgh, and Philadelphia, has just purchased another plant at Primos, Delaware County, Pa. This new acquisition makes five plants which the company operates, for the rebuilding of all classes of contractor's equipment, such as hoisting engines, concrete mixers, steam shovels, locomotive cranes and excavators. The new plant at Primos comprises about eight and one-half acres, approximately one-half of which is now under cover. It is situated on the West Chester division of the Pennsylvania Railroad, about eight miles from the heart of Philadelphia. The organization which the company now maintains at its Philadelphia plant, Thirty-first and Walnut Streets, will move to its new home as soon as work on the buildings is completed.

The Illinois Pipe & Mfg. Co., 2111-2129 South Jefferson Street, Chicago, has moved to 3465 South Lawndale Avenue.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Metal Markets."

Iron and Soft Steel Bars and Shapes

Bars:	Per Lb.
Refined bars, base price	3.23c.
Swedish bars, base price	12.00c.
Soft steel bars, base price	3.23c.
Hoops, base price	4.15c. to 4.28c.
Bands, base price	3.88c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	3.23c. to 3.33c.
Channels, angles and tees under 3 in. x ¼ in., base	3.23c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	3.23c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	3.43c.
Toe calk, ½ x ⅜ in. and larger	3.75c.
Cold-rolled strip, soft and quarter hard	10.00c. to 10.50c.
Open-hearth spring steel	4.50c. to 8.00c.
Shafting and Screw Stock:	
Rounds	4.73c.
Squares, flats and hex	5.23c.
Standard cast steel, base price	14.00c.
Extra cast steel	17.00c.
Special cast steel	22.00c.

Tank Plates—Steel

¼ in. and heavier	3.23c. to 3.33c.

Sheets

Blue Annealed	Per Lb.
No. 10	4.23c. to 4.25c.
No. 12	4.28c. to 4.30c.
No. 14	4.33c. to 4.35c.
No. 16	4.44c. to 4.45c.

Box Annealed—Black:

	Soft Steel C.R., One Pass Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	4.95c. to 5.18c.	.....
Nos. 22 and 24	5.00c. to 5.23c.	5.60c.
No. 26	5.05c. to 5.28c.	5.65c.
No. 28	5.15c. to 5.38c.	5.75c.
No. 30	5.40c. to 5.63c.	.....

No. 28, 36 in. wide, 10c. higher.

Galvanized	Per Lb.
No. 14	4.75c. to 5.38c.
No. 16	5.00c. to 5.63c.
Nos. 18 and 20	5.15c. to 5.78c.
Nos. 22 and 24	5.30c. to 5.93c.
No. 26	5.45c. to 6.08c.
No. 27	5.60c. to 6.23c.
No. 28	5.75c. to 6.38c.
No. 30	6.25c. to 6.88c.

No. 28, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Blk.	Galv.	*Wrought Iron*	Blk.	Galv.
½ in. Butt...	—46	—30	¾ in Butt....	—18	List
¾ in. Butt...	—52	—37	1-1½ in. Butt.	—20	— 2
1-3 in. Butt..	—54	—40	2 in. Lap	—14	+ 3
3½-6 in. Lap.	—49	—35	2½-6 in Lap..	—18	— 2
7-12 in. Lap..	—40	—24	7-12 in. Lap..	— 7	+10

Steel Wire

BASED PRICE* ON No. 9 GAGE AND COARSER	Per Lb.
Bright basic	4.50c.
Annealed soft	4.50c.
Galvanized annealed	5.25c.
Coppered basic	5.00c.
Tinned soft Bessemer	6.50c.

*Regular extras for lighter gages.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	17 c. to 19¼c.
High brass wire	18¼c. to 21¾c.
Brass rod	16 c. to 20¾c.
Brass tube, brazed	30½c. to 31½c.
Brass tube, seamless	20½c. to 21½c.
Copper tube, seamless	22½c. to 23½c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 22c. to 24c. per lb. base.

Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14x20		
			Primes	Wasters
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	80 lb....	$7.30	$7.05
		90 lb....	7.40	7.15
		100 lb....	7.50	7.25
IC.. $11.10	$10.00	IC...	7.70	7.45
IX.. 12.30	11.25	IX...	8.60	8.35
IXX.. 14.10	12.75	IXX...	9.60	9.35
IXXX.. 16.10	14.75	IXXX...	11.00	10.75
IXXXX.. 17.70	16.50	IXXXX...	12.00	11.75

Terne Plates

8-lb. Coating 14 x 20

100 lb.	$8.00
IC	8.25
IX	8.50
Fire door stock	11.50

Tin

Straits pig	35c.
Bar	40c. to 42c.

Copper

Lake ingot	16c.
Electrolytic	16c.
Casting	16c.

Spelter and Sheet Zinc

Western spelter	6½c. to 6¾c.
Sheet zinc, No. 9 base, casks	11½c. open 12c.

Lead and Solder*

American pig lead	6c.
Bar lead	6½c. to 7c.
Solder, ½ and ½ guaranteed	24¼c.
No. 1 solder	21½c.
Refined solder	18½c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	80c.
Commercial grade, per lb	40c.
Grade D, per lb	35c.

Antimony

Asiatic	6½c. to 7c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb.... 30c. to 33c.

Old Metals

Although an easier tone prevails, the market is very sluggish. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	10.50
Copper, heavy and wire	9.75
Copper, light and bottoms	8.00
Brass, heavy	5.75
Brass, light	4.00
Heavy machine composition	9.50
No. 1 yellow brass turnings	5.00
No. 1 red brass or composition turnings	7.50
Lead, heavy	4.00
Lead, tea	3.00
Zinc	3.00